BusConnects Galway: Cross-City Link (University Road to Dublin Road)

August 2022

Natura Impact Statement

BUS CONNECTS GALWAY

SUSTAINABLE TRANSPORT FOR A BETTER CITY.

Natura Impact Statement

BusConnects Galway

Cross City Link (University Road to Dublin Road) Project

REP/012

Prepared by: Moore Group – Environmental Services

15 August 2022

On behalf of Galway City Council

Project Proponent	Galway City Council
Project	BusConnects Galway Cross City Link (University Road to Dublin Road) Project REP/012
Title	Natura Impact Statement BusConnects Galway Cross City Link (University Road to Dublin Road) Project REP/012

Project Number	19170	**Document Ref**	19170 BusConnects Galway NIS Rev4 220815	
Revision	**Description**	**Author**		**Date**
Rev4	Legal Edits	G. O'Donohoe		15 August 2022
Moore Archaeological and Environmental Services Limited				

Abbreviations

AA	Appropriate Assessment
ABP	An Bord Pleanála
CEMP	Construction Environmental Management Plan
EEC	European Economic Community
EPA	Environmental Protection Agency
EU	European Union
FWPM	Freshwater Pearl Mussel
GIS	Geographical Information System
IW	Irish Water
LAP	Local Area Plan
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
OSI	Ordnance Survey Ireland
pNHA	proposed Natural Heritage Area
SAC	Special Area of Conservation
SPA	Special Protection Area
SuDS	Sustainable Drainage System

Contents

1. Introduction

1.1. General Introduction

This Natura Impact Statement (NIS) has been prepared by Moore Group – Environmental Services on behalf of Galway City Council. This NIS report contains information to assist the competent authority in carrying out an Appropriate Assessment (AA) for the purposes of Article 6(3) of the Habitats Directive and section 177V of the Planning and Development Act 2000, as amended, (the "Planning Acts") in respect of the construction and operation of the proposed BusConnects Galway Cross City Link – University Road to Dublin Road Project (hereafter referred to as the Proposed Scheme) on European sites, to ascertain whether or not the Proposed Scheme would adversely affect European site integrity.

This NIS informs the AA process in the determination of any adverse effects on the integrity of European sites, having regard to their conservation objectives and in light of best scientific knowledge. It is necessary that the Project complies with Article 6(3) of the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (referred to as the Habitats Directive). For the purposes of the Proposed Scheme, this is transposed into Irish Law by Part XAB of the Planning and Development Act 2000 as amended[1]. The focus of the assessment is on objectively assessing by reference to the evidence as to whether the Proposed Scheme will adversely affect the integrity of the European sites in light of their conservation objectives.

1.2. Legislative Background - The Habitats and Birds Directives

Articles 6(3) and 6(4) of the Habitats Directive are transposed into Irish Law inter alia by the Part XAB of the Planning Acts (section 177U and 177V) governing the requirement to carry out AA screening and appropriate assessment, where required, per Section 1.1 above.

The Habitats Directive is the main legislative instrument for the protection and conservation of biodiversity in the European Union (EU). Under Article 3 of the Habitats Directive, Member States are obliged to designate Special Areas of Conservation (SACs) which contain habitats or species considered important for protection and conservation in a EU context.

The Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds), transposed into Irish law by the Habitats Regulations 2011, as amended, and the Wildlife Act 1976, as amended, is

[1]The European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477) as amended (referred to as the Habitats Regulations) transposes the Habitats Directive for the purposes of proposed projects subject to legislation other than the Planning and Development Act 2000, as amended.

concerned with the long-term protection and management of all wild bird species and their habitats in the EU. Among other things, the Birds Directive requires that Special Protection Areas (SPAs) be established to protect migratory species and species which are rare, vulnerable, in danger of extinction, or otherwise require special attention.

SACs designated under the Habitats Directive and SPAs, designated under the Birds Directive, form a pan-European network of protected sites known as Natura 2000. The Habitats Directive sets out a unified system for the protection and management of SACs and SPAs. These sites are also referred to in Irish legislation as 'European sites'.

Articles 6(3) and 6(4) of the Habitats Directive set out the requirement for an assessment of proposed plans and projects likely to have a significant effect on Natura 2000 sites.

Article 6(3) establishes the requirement to screen all plans and projects and to carry out an appropriate assessment if required (Appropriate Assessment (AA)). Article 6(4) establishes requirements in cases of imperative reasons of overriding public interest:

> ***Article 6(3):*** *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to an appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

These obligations in relation to AA have been implemented in Ireland under Part XAB of the Planning and Development Act 2000, as amended, and in particular Section 177U and Section 177V thereof.

Section 177T(1)(b) and (2) state as follows with regard to a Natura Impact Statement:

> *"(b) A Natura impact statement means a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed project, on its own or in combination with other plans or projects, for one or more than one European site, in view of the conservation objectives of the site or sites."*
>
> *"(2) Without prejudice to the generality of subsection (1), a Natura impact report or a Natura impact statement, as the case may be, shall include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for one or more than one European site in view of the conservation objectives of the site or sites."*

1.3. Methodology

The Commission's methodological guidance (EC, 2002, 2018, 2021 see Section 1.4 below) promotes a four-stage process to complete the AA and outlines the issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

Stages 1 and 2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of Article 6(3) or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).

Stage 1 Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant. In order to screen out a project, it must be excluded, on the basis of objective information, that the proposed project, individually or in combination with other plans or projects, will have a significant effect on a European site.

Stage 2 Appropriate Assessment: In this stage, there is a consideration of the impact of the project with a view to ascertain whether there will be any adverse effect on the integrity of the Natura 2000 site either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are predicted impacts, an assessment of the potential mitigation of those impacts is considered.

Stage 3 Assessment of Alternative Solutions: This stage examines alternative ways of implementing the project that, where possible, avoid any adverse impacts on the integrity of the Natura 2000 site.

Stage 4 Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the sites will be necessary.

1.4. Guidance

The NIS has been compiled in accordance with guidance contained in the following documents:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010 rev.)(soon to be superseded by EC Guidance in prep.).
- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPWS 1/10 & PSSP 2/10.

- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC, 2018).
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC, 2021).
- Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC, 2021).
- Office of the Planning Regulator (OPR) Practice Note PN01 Appropriate Assessment Screening for Development Management (OPR, 2021).

1.5. Data Sources

Sources of information that were used to collect data on the Natura 2000 network of sites, and the environment within which they are located, are listed below:

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
    - National Parks & Wildlife (NPWS) protected site boundary data;
    - Ordnance Survey of Ireland (OSI) mapping and aerial photography;
    - OSI/Environmental Protection Agency (EPA) rivers and streams, and catchments;
    - Open Street Maps;
    - Digital Elevation Model over Europe (EU-DEM);
    - Google Earth and Bing aerial photography 1995-2022;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
    - Natura 2000 - Standard Data Form;
    - Conservation Objectives;
    - Site Synopses;
- National Biodiversity Data Centre records;
    - Online database of rare, threatened and protected species;
    - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019); and
- Relevant Development Plans in neighbouring areas;
    - Galway City Development Plan 2017-2023
    - Galway County Development Plan 2022-2028

1.6. Statement of Authority

This report was compiled by Ger O'Donohoe (B.Sc. Applied Aquatic Sciences (GMIT, 1993) & M.Sc. Environmental Sciences (TCD, 1999)) who has over 30 years' experience in environmental impact

assessment and has completed numerous reports for AA Screening and Natura Impact Statements in terrestrial and aquatic habitats.

Engineering and technical data was supplied by Arup as Consulting Engineers for the Proposed Scheme.

1.7. Description of the Proposed Scheme

This report presents the relevant information to enable the AA process to be undertaken for the Proposed BusConnects Galway (Cross City Link – University Road to Dublin Road) Scheme consisting of the alteration of existing road layouts, including junction layouts, footpaths, signalling, pedestrian crossings, drainage and other associated works.

An overview of the likely scheme construction phasing and the necessary construction works associated with each phase is outlined below.

For the majority of the works associated with the scheme, it is envisaged that normal working hours will be followed. In specific circumstances, such as road crossings or road resurfacing, the works will be carried out at night.

Existing signage will be retained or relocated within widened footpaths. Additional new signage will also be required at locations throughout the scheme. Typical excavation depths for installation of new signage will be approximately 1m.

Existing road markings will be retained where still valid within the carriageway. New road markings will be applied at locations throughout the scheme either via removal and replacement of existing markings or application of new road markings following resurfacing works.

Utility covers will be raised to match new ground heights where applicable.

University Road

Along University Road (from the junction with Newcastle Road to the Salmon Weir Bridge), the proposed scheme works will involve footpath widening, provision of an entry treatments at the entrance to NUIG, provision of two raised tables along the route at Canal Road Upper and Fisheries Field and the provision of two new signalised pedestrian crossings. Between the entrance to Fisheries Field and the Salmon Weir Bridge, it is proposed to install a bus gate and to designate the carriageway as a time-regulated bus lane in both directions.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths.

Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully pots and new connection pipes is 1.7-1.8m. This new drainage network will outfall to the canal in the vicinity of Canal Road Upper. It will outfall via a proposed new petrol interceptor in Canal Road, which will require excavation of approximately 3.0m -3.5m for installation. Works will involve the diversion of Irish Water network within the new footpath. Other utilities, where present will be retained within the new footpath.

Ducting for the proposed signalised pedestrian crossing will be trenched across the road and into the footpath with a maximum excavation depth of 1.2m.

For the provision of entry treatments (at the entrance to NUIG) and the raised tables (at the junction with Canal Road Upper and the entrance to Fisheries Field), the works will involve the milling of the top layer of surface course, application of bond coat and the construction of the entry treatment/raised table utilising bituminous materials. The proposed bus gate adjacent to the Fisheries Field entrance will be installed within the raised table.

Temporary traffic management will be required to accommodate these works, including narrowing the road to a one-way shuttle system to facilitate road crossing trenches, works through narrow pinch points at certain times and for the surfacing of the road. The duration is estimated to be approximately 8 weeks. In addition the closure of Canal Road Upper to all vehicles for a duration of 3 days is expected for the installation of the petrol interceptor.

Gaol Road and Galway Cathedral

To the west of Galway Cathedral, on Gaol Road, the works involve footpath widening at the junction with University Road and to the south on Gaol Road the works involve re-development of the car and coach parking area to the south of Galway Cathedral. To the east of Galway Cathedral, the works involve the closure of the existing carriageway and creation of a pedestrianised public space.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. Other utilities, where present will be retained within the new footpath.

The car parking area south of Galway Cathedral will require the existing car parking area to be removed (including removal of existing kerbing and milling of the top layer of surface course). New carriageway surfacing, concrete islands and footpaths are to be provided within the revised car park area. The maximum depth of excavation within the existing car park is 300mm with trenches for new drainage connection pipes to be excavated to a maximum depth of 1.2m.

The area to the east of Galway Cathedral is to be closed to vehicular traffic and designated as a public pedestrian and landscaped space, and the carriageway and footpaths that will ultimately become part of the public space will be removed and/or regraded, with a new paved and landscaped area installed to connect with the existing walls to the east (adjacent to the Canal) and to tie into the proposed landing area of the proposed Salmon Weir Pedestrian and Cycle bridge which is due to complete construction by Q4 2022. This will require the removal of the existing bituminous layers on the road and replacement with new materials.

It is proposed that the existing surface car-park will be utilised as a construction compound for the contractor during the works, with this area being completed as per the scheme design at the end of the scheme. This will include connections to existing power, water and drainage services for the duration of the construction works.

Temporary traffic management will be required to accommodate these works, and the duration is estimated to be approximately 16 weeks (initial 12 weeks at the beginning of the programme and a further 4 week at the end of the programme upon removal of the proposed contractors compound).

The proposed works will be undertaken in in a single main phase of traffic management:

Gaol Road (west of the cathedral) will be converted into a two-way traffic route and Gaol Road (east of the cathedral) will be closed to traffic form part of the works area. The car-park will form part of the works area for the duration of the scheme. Access to Nuns Island to be maintained for the duration.

Salmon Weir Bridge

On the Salmon Weir Bridge, the works include widening the existing footpath on the northern side of the bridge and the removal of the footpath on the southern side of the bridge and replacing it with a rubbing strip. Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Other utilities, where present will be either retained, protected or diverted as required. Temporary traffic management will be required to accommodate these works, and the duration is estimated to be approximately 4 weeks.

Newtownsmith/Waterside

The works at this location will involve the permanent closure of Waterside as it approaches St. Vincent's Avenue from the north (with the resultant space used to create a public space), and the narrowing of Newtownsmith as it approaches St. Vincent's Avenue from the south (reduced to a single northbound traffic lane, with resultant wider footpaths).

The pedestrianised area of Newtownsmith will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new surface to be raised and constructed at the level of the existing footway. This will require excavations

of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. The maximum depth of excavation pit of the installation of bollards is 1.6m. Other utilities, where present will be either retained, protected or diverted as required.

The carriageway and footpaths on Waterside that will ultimately become part of the public space will be removed and/or regraded, with a new paved area installed to connect with the existing footpaths (either kerbside where connecting to an existing footpath or at the back of a fully-replaced footpath) either side. This will require the removal of the existing bituminous layers on the road and replacement with new materials.

Temporary traffic management will be required to accommodate these works (with Newtownsmith likely requiring a road closure), and the duration is estimated to be approximately 8 weeks.

St. Vincent's Avenue/Walsh's Terrace

Localised works along St. Vincent's Avenue and Walsh's Terrace (between the Salmon Weir Bridge and Dyke Road) involve footpath widening and the upgrade of the junction at Woodquay (which is to be tightened up and replaced with a single, in-only road from St. Vincent's Avenue). A large, raised table, incorporating a toucan crossing is to be installed between and including the Corrib Terrace and Riverside junctions.

An entry treatment is proposed at the junction with Court Lane, and a small improvement to the junction with Court Avenue to provide a sufficient footpath on the eastern side of the junction. Footpath widening and landscaping works are proposed along the R866 Headford Road (Walsh's Terrace) between Woodquay and Bothar na mBan. Other improvement works within the Woodquay area itself are addressed below

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The existing drainage pipe on Headford Road (Walsh's Terrace) to be moved onto northern side of the road. The maximum depth of trench excavation required to install the new drainage, gully pots and new connection pipes is 1.5m – 2.3m.

Works will involve the diversion of a section of Virgin Media network in the new footpath. ESB box and pole will need to be moved to avoid conflict with the new kerb. Similarly, a manhole will require relocation. A small section of existing watermain will also need to be diverted on Walsh's Terrace in the proposed footpath. Other utilities, where present will be either retained, protected or diverted as required.

For the provision of the entry treatment at Court Lane, the works will involve the milling of the top layer of surface course, application of bond coat and the construction of the entry treatment/raised table utilising bituminous materials.

Temporary traffic management will be required to accommodate these works, including the likely requirement for lane closures and a shuttle traffic system, and the duration is estimated to be approximately 6 weeks.

Dyke Road/Headford Road

Works on Dyke Road and the Headford Road include footpath widening on Dyke Road, the signalisation of the junction of Dyke Road (heading north) and Dyke Road (heading east) and the signalisation of the junction of Dyke Road/Headford Road/St. Bridget's Place.

A short section of Dyke Road is also to have its carriageway widened (approaching the signalised junction of Dyke Road northbound/Dyke Road eastbound) and also realigned into a portion of the Dyke Road carpark. Junctions to be signalised will have pedestrian crossings incorporated.
Improvement works on Bóthar na mBan/St. Brendan's Avenue are addressed below.
Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install the new drainage, gully pots and new connection pipes is 1.5m.

Works on Dyke Road will involve the decommissioning and diversion of a section of the existing ESB MV UG line. Similarly, a section of existing Eir duct and IW watermain will need to be decommissioned and diverted. An unidentified manhole will also require relocation to avoid the proposed kerb. Other utilities, where present will be either retained, protected or diverted as required.

Carriageway widening works will require the existing footpath to be broken out, full road build-up to be constructed and jointed to the existing adjacent carriageway, and replacement footpath constructed. Existing drainage, present kerbside, and other utilities present within the section of footpath to be removed will be relocated to the new kerb edge or the new footpath.

Ducting for the proposed signalisation works will be trenched across the road and into the footpath with a maximum excavation depth of 1.2m.

Temporary traffic management will be required to accommodate these works, including a one-way system and lane closures and a shuttle traffic systems, and the duration is estimated to be approximately 10 weeks.

St. Francis Street/Eglinton Street/Williamsgate Street

The works on St. Francis Street/Eglinton Street involve localised footpath widening along Eglinton Street and in the vicinity of the junction with Mary Street/Daly's Place, the provision of a new signalised crossing on St. Francis Street and the signalisation of the junction with Mary Street/Daly's Place.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage

network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. An ESB pole will need to be relocated on Saint Francis Street to avoid conflict with the proposed Bus Shelter. A telecom chamber and a Manhole will be relocated into the proposed footpath on Eglinton Street. Other utilities, where present will be either retained, protected or diverted as required.

Ducting for the proposed signalised pedestrian crossing will be trenched across the road and into the footpath with a maximum excavation depth of 1.2m.

Temporary traffic management will be required to accommodate these works, including lane/road closures and a resultant shuttle traffic system, and the duration is estimated to be approximately 8 weeks.

Woodquay/Daly's Place/Mary Street

The works within Woodquay involve the removal of a substantial portion of the carriageway space and conversion of same to a pedestrian and landscaped public space through extensive footpath widening and landscaping and the provision of a southbound traffic lane linking Wood Quay to Daly's Place/Eyre Street. Entry treatments are also proposed at the junction with St. Brendan's Avenue and the junction with St. Anthony's Place. A contra-flow cycle track from Daly's Place to St. Vincent's Avenue is also proposed.

On Mary Street, the works involve localised footpath widening approaching the junction with Eglinton Street, which is to be signalised.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m.

Several manholes will need to be relocated to avoid conflict with proposed kerbs. Other utilities, where present will be either retained, protected or diverted as required.

At the proposed traffic signal junction, new ducting, crossing the road on all arms of the junction will require trenches to be excavated up to a maximum depth of 1.2m

For the provision of the entry treatments, the works will involve the milling of the top layer of surface course, application of bond coat and the construction of the entry treatment/raised table utilising bituminous materials.

Temporary traffic management will be required to accommodate these works, including lane/road closures and a resultant shuttle traffic system, and the duration is estimated to be approximately 12 weeks.

Bóthar na mBan/St. Brendan's Avenue

Along Bothar na mBan (from its junction with Prospect Hill to its junction with Headford Road), the proposed scheme works will involve road realignment, entry treatment installation, footpath widening, new footpath and also the demolition of two residential properties.

The two residential properties to be demolished are No. 20 St. Brendan's Avenue and No. 5/6 Headford Road. Both of these properties are end of terrace houses, with a shared wall to the adjoining property. Demolition will require the removal of all above ground structures, potentially including the presence of asbestos, the decommissioning of utilities including water, electricity, gas and telecoms. Removal of domestic oil tanks and pipes will likely be necessary. Breaking out and removal of foundations will also be necessary. Party walls will be required to be maintained and supported during demolition.

Road widening and realignment is necessary at both ends of Bothar na mBan, in the location of the two residential properties to be demolished and also realignment of the road onto lands at Galway County Council County Hall. New carriageway will require the existing footpath to be broken out, full road build-up to be constructed and jointed to the existing adjacent carriageway, and replacement footpath constructed.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. Works will involve the decommissioning and diversion of a section of the existing ESB LV UG line. Additionally, a section of the ESB LV OH Cable will be undergrounded in the new footpath. Similarly, a section of existing Eir duct and chambers will need to be decommissioned and diverted. Several manholes will need to be relocated to avoid conflict with proposed kerbs. Other utilities, where present will be either retained, protected or diverted as required.

For the provision of entry treatments (at the entrance to Eyre Square North, Bothar Irwin and St. Brendan's Avenue), the works will involve the milling of the top layer of surface course, application of bond coat and the construction of the entry treatment/raised table utilising bituminous materials and natural stone.

Ducting for the proposed signalised pedestrian crossing will be trenched across the road and into the footpath with a maximum excavation depth of 1.2m.

Temporary traffic management will be required to accommodate these works, including lane closures and a resultant shuttle traffic system, and the duration is estimated to be approximately 20 weeks.

Prospect Hill

The works on Prospect Hill comprise the signalisation of the junction with Bohermore/Bóthar Uí hÉithir and the realignment of the junction with Bóthar na mBan (to re-designate Prospect Hill to the south-west as the minor arm of a T junction with a proposed entry treatment). A portion of the existing footpath and stone wall outside the entrance to Galway County Hall will be removed to facilitate the junction realignment, with the boundary wall and existing footpath both set back.

The works will also involve the conversion of Prospect Hill (between Bóthar na mBan and Eyre Square) into a two-way traffic route which then becomes a looped, one-way circular carriageway route that approaches Eyre Square before looping around and returning out via the two-way portion of Prospect Hill (this is to facilitate a taxi rank, drop-off and loading and to allow onward loading access to Eyre Square North at specific times via a new access-controlled link

Footpath widening will also be carried out (as a number of existing traffic lanes are to be removed). Carriageway widening and new carriageway construction will be required as part of the realignment of the junction with Bóthar na mBan and the new one-way looped route.

A signalised pedestrian crossing is also proposed on Bóthar na mBan adjacent to the new T-junction with Prospect Hill.

Significant public realm and landscaping works are proposed between Eyre Square and Bother na mBan requiring replacement of the entire surface.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. A section of a watermain at the Prospect Hill /Bóthar na mBan junction will require protection. An Eir Chamber will need to be relocated to avoid conflict with the new kerb at the Prospect Hill/Bóthar Uí hÉithir junction. Other utilities, where present will be either retained, protected or diverted as required

For the provision of the entry treatments, the works will involve the milling of the top layer of surface course, application of bond coat and the construction of the entry treatment/raised table utilising bituminous materials and natural stone.

New carriageway (to be provided along the proposed one-way loop and outside Galway County Hall) will require the existing footpath to be broken out, full road build-up to be constructed and jointed to the existing adjacent carriageway, and replacement footpath constructed. Existing drainage present kerbside, and other

utilities present within the section of footpath to be removed will be relocated to the new kerb edge or the new footpath.

Ducting for the proposed signalised pedestrian crossing will be trenched across the road and into the footpath with a maximum excavation depth of 1.2m.

Temporary traffic management will be required to accommodate these works, including lane/road closures and a resultant shuttle traffic system, and the duration is estimated to be approximately 8 weeks.

Eyre Square North/Eyre Square East/Eyre Square South

The works on Eyre Square North involve the removal of the carriageway space running parallel to Eyre Square North (to the north of the Liam Mellows Statue) and conversion of this area to a pedestrianised and landscaped public space. The vehicular linkage between Eyre Square North and Prospect Hill is also to be closed and replaced with a time-dependent controlled access link (controlled through retractable bollards) to facilitate access for loading and local access to

On Eyre Square East, the works involve localised footpath widening at the northeastern corner (between Eyre Square East and Eyre Square North) and upgrade of the existing pedestrian crossing at the same location, the provision of an entry treatment at St. Patrick's Avenue and localised carriageway widening at the south-eastern corner. The junction of Eyre Square East, Eyre Square South and Forster Street is to be fully signalised. On Eyre Square South minimal works are proposed.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. Enet chambers and several other manholes to be relocated to avoid conflict with the proposed kerb. Other utilities, where present will be either retained, protected or diverted as required.

Carriageway widening works will require the existing footpath to be broken out, full road build-up to be constructed and jointed to the existing adjacent carriageway, and replacement footpath constructed. Existing drainage present kerbside, and other utilities present within the section of footpath to be removed will be relocated to the new kerb edge or the new footpath.

For the provision of the entry treatment, the works will involve the milling of the top layer of surface course, application of bond coat and the construction of the entry treatment/raised table utilising bituminous materials and natural stone.

Ducting for the proposed signalisation works will be trenched across the road and into the footpath with a maximum excavation depth of 1.2m. The maximum depth of excavation pit of the installation of bollards is 1.5m.

Temporary traffic management will be required to accommodate these works, including lane/road closures and a resultant shuttle traffic system, and the duration is estimated to be approximately 20 weeks.

Victoria Place/Merchant's Road/Queen Street

Localised works on Victoria Place, Merchant's Road and Queen Street primarily involve footpath widening, provision of new raised uncontrolled pedestrian crossings and two new signalised pedestrian crossings on Forthill Road. An entry treatment is proposed at the junction of Forthill Road and Queen Street, and a new footpath is proposed on the south-eastern side of Dock Road, between Queen Street and Bóthar na Long. The existing signalised junction at Bóthar na Long/Dock Road (the triangular island) is to be upgraded to provide a signalised pedestrian crossing on the approach from the east (i.e. all three arms will have a signalised pedestrian crossing).

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. A new drainage pipe to be laid on Merchants Road and Forthill Street, with and outlet to tie into existing network on Queen Street. The depth of trench excavation required to install the new drainage, gully post and new connection pipes is 1.55m. Works will also involve the diversion of a watermain on Merchants Road. Several manholes will need to be relocated to avoid conflict with proposed kerbs. Other utilities, where present will be either retained, protected or diverted as required.

For the provision of the entry treatments/raised uncontrolled crossings, the works will involve the milling of the top layer of surface course, application of bond coat and the construction of the entry treatment/raised table utilising bituminous materials and natural stone.

Ducting for the proposed signalisation works will be trenched across the road and into the footpath with a maximum excavation depth of 1.2m.

Temporary traffic management will be required to accommodate these works, including lane/road closures and a resultant shuttle traffic system, and the duration is estimated to be approximately 6 weeks.

Forster Street

The works on Forster Street involve the replacement of existing footpaths and widening of footpaths to the eastern end of the street, in the vicinity of the junction with Bóthar Uí hEithir/College Road/Fairgreen Road. The works at that junction are detailed below.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths.

Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. Other utilities, where present will be either retained, protected or diverted as required.

Temporary traffic management will be required to accommodate these works, including lane closures and a resultant shuttle traffic system, and the duration is estimated to be approximately 4 weeks

College Road/Forster Street/Fairgreen Road/Bóthar Uí Either junction

The works at this junction comprise the upgrade of the junction to reduce the overall size and provide wider footpaths and shorter crossing distances.

Therefore, the works primarily comprise footpath widening and the removal of islands within the main carriageway and the installation of replacement traffic signals.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. Other utilities, where present will be either retained, protected or diverted as required.

Islands within the main carriageway will be broken out and the carriageway within the junction resurfaced. This will require the removal of the existing bituminous layers on the road and replacement with new materials.

Ducting for the proposed signalisation works will be trenched across the road and Temporary traffic management will be required to accommodate these works, including lane closures and a resultant shuttle traffic system, and the duration is estimated to be approximately 10 weeks.

Bóthar Uí hEithir

Works on Bóthar Uí hEithir are localised in nature and primarily comprise localised footpath widening at the junction to the south (with Forster Street/College Road) and the junction to the north (with Prospect Hill/Bohermore).

An entry treatment is also proposed at the entrance to Forster Court, and the existing entrance into the grounds of St. Patrick's Church (towards the southern end of Bóthar Uí hÉithir) is to be amended.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. Other utilities, where present will be either retained, protected or diverted as required.

For the provision of the entry treatment the works will involve the milling of the top layer of surface course, application of bond coat and the construction of the entry treatment/raised table utilising bituminous materials and natural stone.

Temporary traffic management will be required to accommodate these works, including lane closures, and the duration is estimated to be approximately 4 weeks.

Fairgreen Road

The works at Fairgreen Road primarily comprise the upgrade at the signalised junction with College Road/Forster Street, the provision of new entry treatments and some localised footpath widening in the vicinity of the entrance to the Radisson Blu Hotel, footpath replacement and the installation of a new controlled pedestrian crossing between Fairgreen House and the coach station. .

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. Several manholes will need to be relocated to avoid conflict with proposed kerbs. Other utilities, where present will be either retained, protected or diverted as required.

For the provision of entry treatments, the works will involve the milling of the top layer of surface course, application of bond coat and the construction of the entry treatment/raised table utilising bituminous materials.

Temporary traffic management will be required to accommodate these works, including lane closures, and the duration is estimated to be approximately 3 weeks.

College Road (Forster Street to Lough Atalia Road)

The works along College Road between the junction with Forster Street and the junction with Lough Atalia Road primarily comprise localised footpath widening works, the provision of entry treatments at a number of junctions, new priority pedestrian crossings and the installation of a bus gate on College Road, west of the entrance to Galway City Hall.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect to a new drainage network. A new drainage pipe is to be laid along a section of the College Road from Yeats College to Lough Atalia. The maximum depth of trench excavation required to install the new drainage pipe, gully post and new connection pipes is 1.75m. Works will involve the relocation of Eir chambers and duct that conflict with the kerb adjacent the College Road/Glenmore Junction. Two additional Telecom chambers and several

manholes will be relocated along the College Road. Other utilities, where present will be either retained, protected or diverted as required.

For the provision of the entry treatments the works will involve the milling of the top layer of surface course, application of bond coat and the construction of the entry treatment/raised table utilising bituminous materials. Carriageway widening works (at the localised realignment point) will require the existing footpath to be broken out, full road build-up to be constructed and jointed to the existing adjacent carriageway, and replacement footpath constructed. Existing drainage present kerbside, and other utilities present within the section of footpath to be removed will be relocated to the new kerb edge or the new footpath.

Ducting for the proposed signalised pedestrian crossing and the proposed zebra crossing will be trenched across the road and into the footpath with a maximum excavation depth of 1.2m.

For the proposed bus gate, the works primarily involve footpath widening, the installation of traffic signals and the application of a coloured red resin surface to the carriageway on either side of the bus gate to delineate the proposed vehicle restrictions.

Temporary traffic management will be required to accommodate these works, including lane closures, and the duration is estimated to be approximately 6 weeks.

College Road/Lough Atalia Road junction

The junction of College Road/Lough Atalia Road is to be realigned into a standard, signal controlled, T-junction arrangement, with a reduced junction footprint. The College Road (from City Hall) arm of the junction will be the minor arm of the 'T' arrangement. Existing traffic islands within the existing junction are to be removed, and the College Road approach to the junction realigned to route through the existing grassed area between College Road and Lough Atalia Road. The new T-junction will be signalised. The existing junction area that becomes redundant will be used to provide new or widened footpaths and provision of new landscaped areas. The existing entrance to Loyola Park will be retained in its current location, but altered to a priority controlled access with a new entry treatment and kerblines.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the new drainage network. A new drainage pipe and non-return valve to be installed at discharge point into Lough Atalia. The maximum depth of trench excavation required to install the new pipe, gully post and new connection pipes is 2.2m. Additionally, new attenuation tank and petrol interceptor will need to be installed, which will require excavation of approximately 3.5m -3.75m for installation. The outfall for the new pipe will be relocated in the existing rock armour along the shore of Lough Atalia, on the northern side of the existing playground. All works will be carried out from the land side.

Works will involve the decommissioning and diversion of existing Eir and Virgin Media ducts. Additionally, an ESB LV OH line will need to be diverted and an electrical pole will need to be relocated. A manhole will need to be relocated to avoid the proposed kerb. Other utilities, where present will be either retained, protected or diverted as required.

For the provision of the entry treatments the works will involve the milling of the top layer of surface course, application of bond coat and the construction of the entry treatment/raised table utilising bituminous materials.

The construction of new carriageway in existing hardstanding areas will require the existing footpath to be broken out, full road build-up to be constructed and jointed to the existing adjacent carriageway, and replacement footpath constructed. Existing drainage present kerbside, and other utilities present within the section of footpath to be removed will be relocated to the new kerb edge or the new footpath. Where the carriageway is to be constructed in grassed areas, excavation and full road build-up will be required. Where islands are to be removed, the carriageway surface beneath will be resurfaced and jointed to the adjacent carriageway surface.

Ducting for the proposed signalisation works will be trenched across the road and into the footpath with a maximum excavation depth of 1.2m.

Temporary traffic management will be required to accommodate these works, including lane closures, and the duration is estimated to be approximately 12 weeks.

College Road (Lough Atalia Road to junction at Moneenageisha)

The works proposed on College Road (between Lough Atalia Road and Moneenageisha) comprise significant carriageway widening on the western side of College Road to facilitate the construction of an additional outbound bus lane and inbound cycle track. Entry treatments are proposed at the entrances to Loyola Park, Gleann Nóinín and the Huntsman Inn.

Boundary walls along the section to be widened will be removed and set back at five properties (139 College Road, Gleann Noinin, Circle K, Moneenageisha Court and Bay View House). At 139 College Road and Gleann Noinin the existing lands within property boundaries will be broken out/excavated as necessary.

At Circle K, the proposed boundary will be set back. This will require the temporary acquisition of the entire Circle K property in order to complete the works. The works will include the decommissioning of all fuel tanks and systems in accordance with industry standards and according to best practice under Association for Petroleum and Explosives Administration (APEA) guidance. The works will include the complete removal of 2 of the 6 underground fuel storage tanks located on the site. It will also include the removal of 2 of the existing pumping stations located in the forecourt of the site. The existing canopy over the forecourt will require removal and replacement with a smaller canopy which will not overhang the relocated boundary will and the existing display signage will be required to be set back. The removal of the 2 underground tanks and the removal of the 2 pumping stations will also require the removal and relocation of a number of underground fuel pipes within the site.

At Moneenageisha Court, the existing boundary wall will be set back. This boundary wall is a retaining wall. A proposed new retaining wall (which retains a level difference of approximately 1.2m) will be constructed along the proposed new boundary.

This wall will have an exposed face of approximately 2.4m on the College Road side. The wall will be a reinforced concrete wall and will require excavations of approximately 2.0m below existing ground level across the frontage of Moneenageisha Court with the temporary removal of the existing road parallel to College Road. Replacement car-parking is proposed within Moneenageisha Court.

At Bay View House, the existing boundary wall will be set back. This boundary wall is a retaining wall. A proposed new retaining wall (which retains a level difference of approximately 0.9m) will be constructed along the proposed new boundary. The existing access gates and steps will be reconstructed along the new boundary. Internal car parking will be re-configured.

New carriageway will require the existing footpath to be broken out, full road build-up to be constructed and jointed to the existing adjacent carriageway, and replacement footpath and cycle-track constructed.

Drainage gullies will be relocated to the new kerb edge and will connect back to the new drainage network. Two runs of new drainage pipes are to be laid in the roadway, carrying the water in opposite directions. They will outfall via proposed petrol interceptors, which will require excavation of

approximately 3.2m -3.4m for installation. The maximum depth of trench excavation required to install the new pipes, gully post and new connection pipes is 2.0m.

Works will involve the decommissioning and diversion of existing ESB LV UG Line, MV UG Line and LV OH cable, along with a pole, into the new footpath. Additionally, runs of Eir, Virgin Media and BT ducts will be diverted. Several manholes will need to be relocated to avoid conflict with proposed kerbs. Other utilities, where present will be either retained, protected or diverted as required.

Temporary traffic management will be required to accommodate these works, including lane closures, and the duration is estimated to be approximately 20 weeks.

Moneenageisha Junction

The works at the junction at Moneenageisha involve the upgrade of the junction to provide two bus priority gates on approach to and through the junction from the College Road approach and also from the Dublin Road approach.

Removal and amendments to existing splitter islands are also proposed on order to facilitate the new cycle tracks, toucan crossing and proposed widened footpaths in some locations. The works predominantly relate to island removal, footpath widening and replacement of traffic signals.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed.

This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. Works will include diversion of an ESB MV UG line, a section of which is within the junction. Other utilities, where present will be either retained, protected or diverted as required.

Islands within the main carriageway will require the existing islands to be broken out, full road build-up to be constructed and jointed to the existing adjacent carriageway. This will require the removal of the existing bituminous layers on the road and replacement with new materials. New/relocated splitter islands will require the carriageway surface course to be milled out and new islands constructed.

Where existing ducting cannot be re-used, ducting for the relocated signals will be trenched across the road and into the footpath with a maximum excavation depth of 1.2m.

Temporary traffic management will be required to accommodate these works, including lane/road closures, and the duration is estimated to be approximately 10 weeks.

R338 Dublin Road

The works on the R338 Dublin Road comprise the installation of inbound and outbound bus lanes, raised adjacent cycle tracks and footpaths on both sides of the road. This is to be achieved via a combination

of carriageway widening, repurposing of existing traffic lanes and setting back the existing footpath. An entry treatment is proposed at the entrance to the Huntsman Inn and Wellpark Retail Park.

Approaching the junction at Moneenageisha, footpath widening is proposed as part of the tightening of the entrance to the junction (removal of the left-slip to College Road, etc.).

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to a new drainage network. Three runs of drainage pipes will be laid within the roadway with outlets to tie into the existing network. The maximum depth of trench excavation required to install the drainage pipes, gully post and new connection pipes is 1.8m – 2.3m. Additionally two new petrol interceptor will require excavation of approximately 3.0m -3.5m for installation.

Works will involve the diversion of two runs of ESB MV UG Line along the Old Dublin Road, along with diversions of a watermain and an Eir Duct. Other utilities, where present will be either retained, protected or diverted as required.

Carriageway widening works will require the existing footpath to be broken out, full road build-up to be constructed and jointed to the existing adjacent carriageway, and replacement footpath/raised adjacent cycle lane to be constructed. Existing drainage present kerbside, and other utilities present within the section of footpath to be removed will be relocated to the new kerb edge or the new footpath.

Carriageway widening works on the Lough Atalia side of Dublin Road, between Brothers of Charity and the existing billboard adjacent to the Huntsman Inn comprises a new 4.0 m wide footway/cycleway offset approximately 0.9m from the SPA boundary opposite the Eye cinema. Due to the uncertainty of the existing wall, it is proposed to install a new retaining wall through here to support the footway/cycleway, which is approximately 1.3m above the depressed bay level. To avoid encroachment into the SPA boundary, it is proposed to retain the existing stone wall/embankment by constructing a mass concrete gravity wall in behind it. This requires the material in behind the wall to be excavated out and then backfilled with mass concrete. Due to the potential instability of the stone wall, care is required during construction to protect the existing stone wall/embankment. The area behind the wall is designated as an SPA and hence all efforts will be made to avoid collapse of the existing wall/slope. This may require the installation of a temporary/sacrificial support to maintain the integrity of the slope and contain the concrete from seeping through the stone wall and into the SPA beyond. Protection from construction run-off into the SPA will also need to be implemented during construction along this section.

A portion of the landscaped area in front of the grounds of the G Hotel will be removed to facilitate footpath re-location and the construction of the raised adjacent cycle lane. This will require the landscaped area to be removed and excavated to allow the footpath/cycle lane to be constructed.

Temporary traffic management will be required to accommodate these works, including lane closures and the duration is estimated to be approximately 16 weeks.

Galway Harbour Enterprise Park

It is proposed to use two sections of the Galway Harbour Enterprise Park as Construction Compounds. The areas comprise existing rough ground compounds with recolonising bare ground being the predominant habitat.

Figure 1 shows the Proposed Scheme location and Figure 2 shows a detailed view of the Proposed Scheme boundary on recent aerial photography. Figures 3 to 15 present plans of the Proposed Scheme.

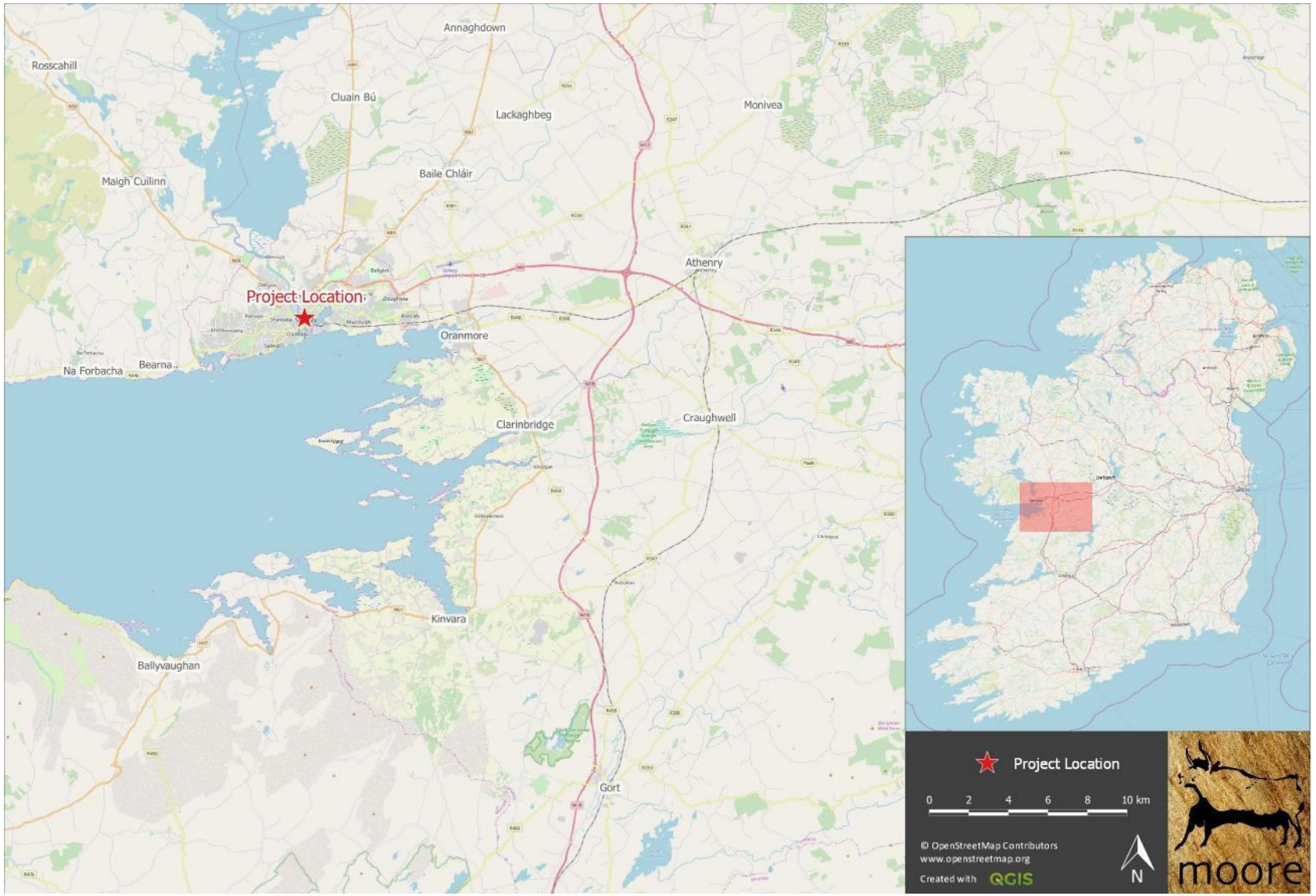

Figure 1. Showing the Proposed Scheme location in Galway City.

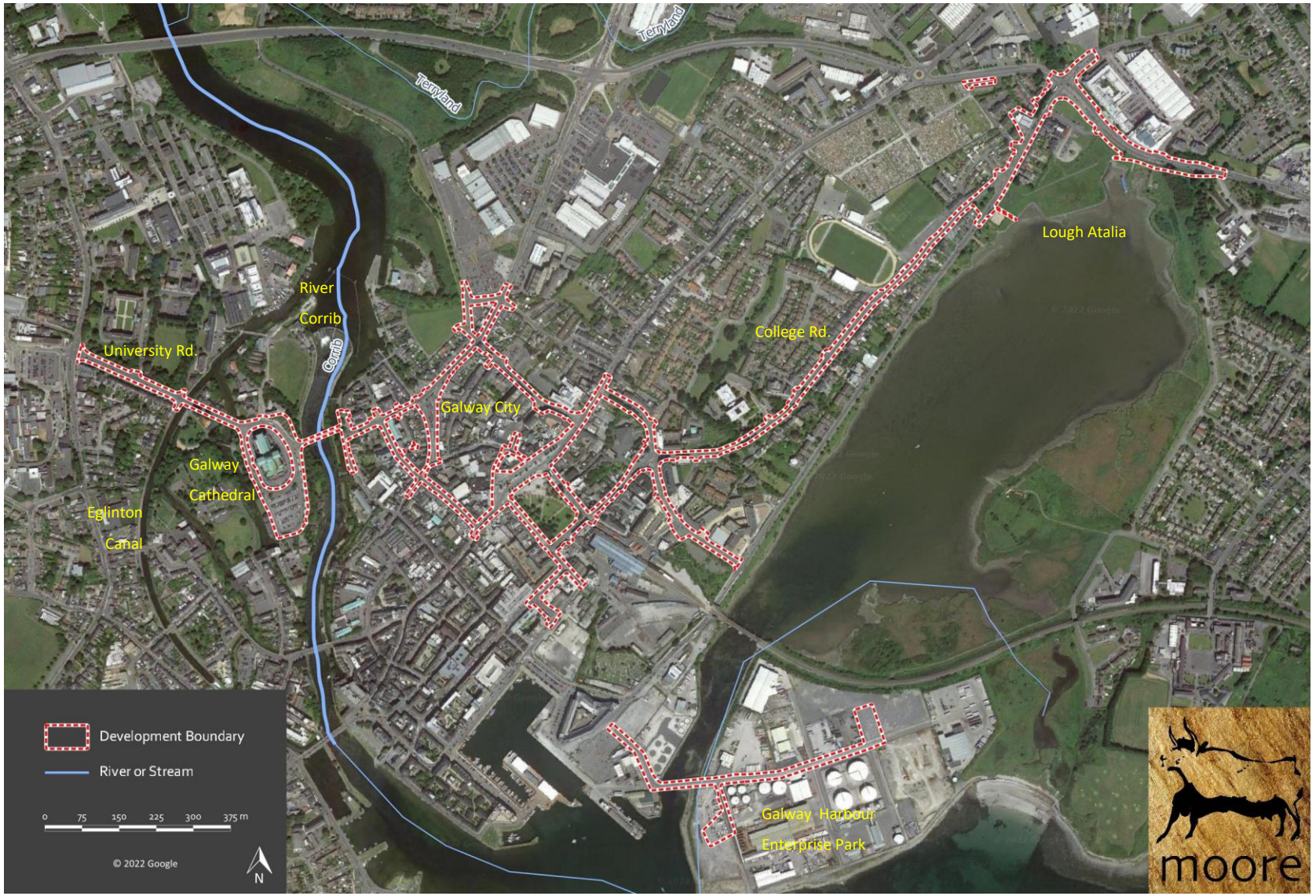

Figure 2. Showing the Proposed Scheme on recent aerial photography.

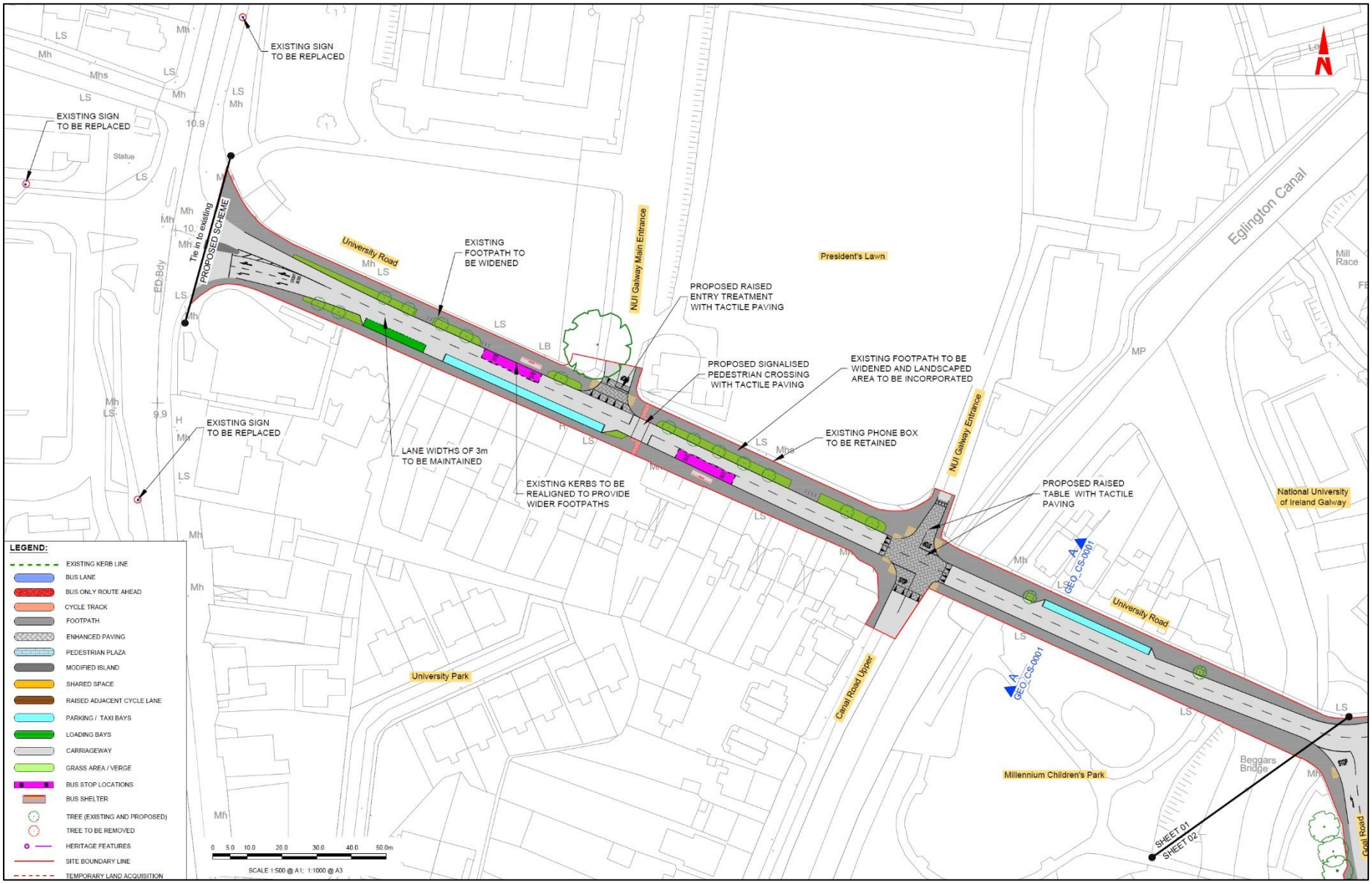

Figure 3. Plan of the Proposed Scheme 1 of 13 (note rotated N).

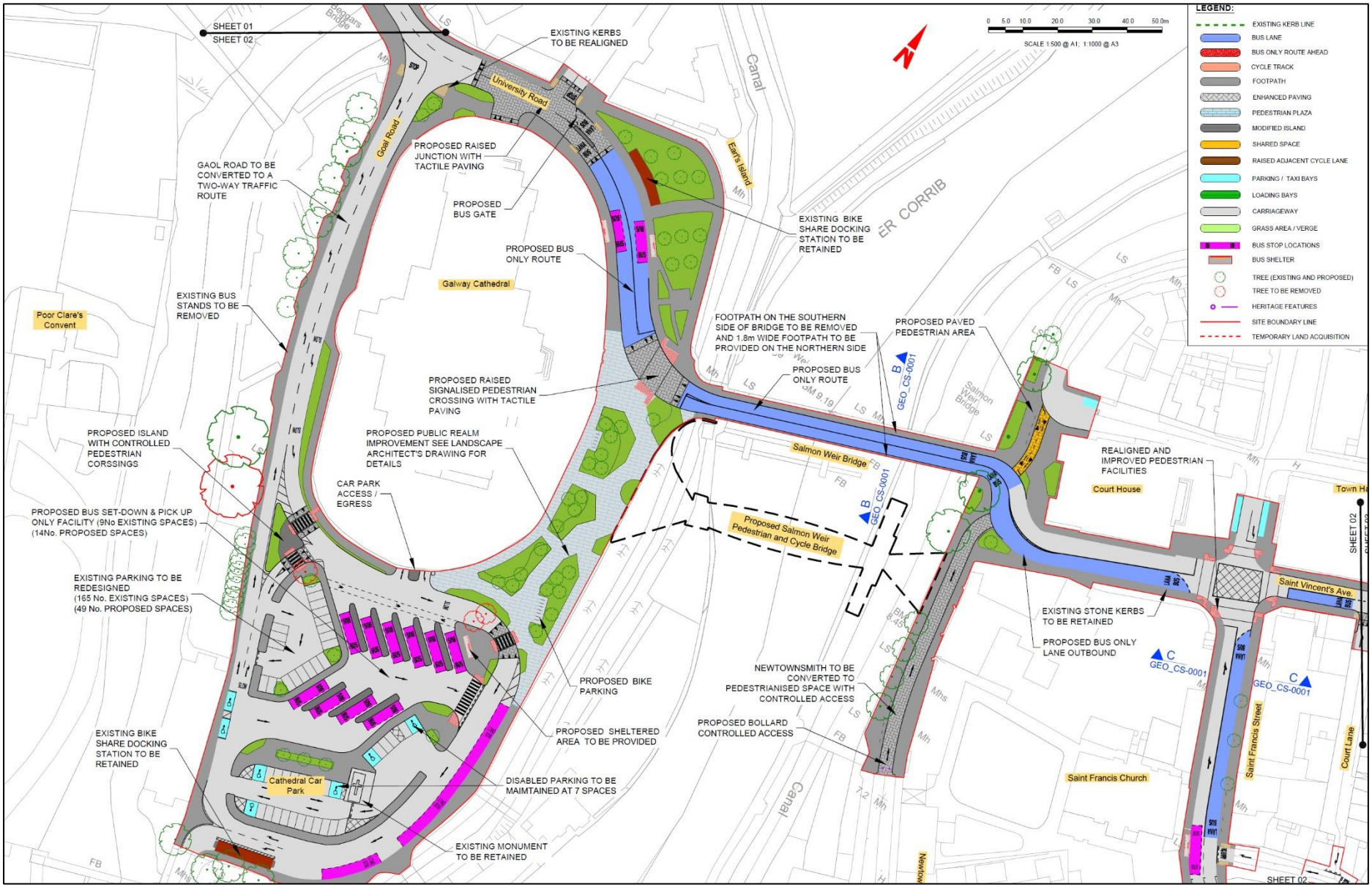

Figure 4. Plan of the Proposed Scheme 2 of 13 (note rotated N).

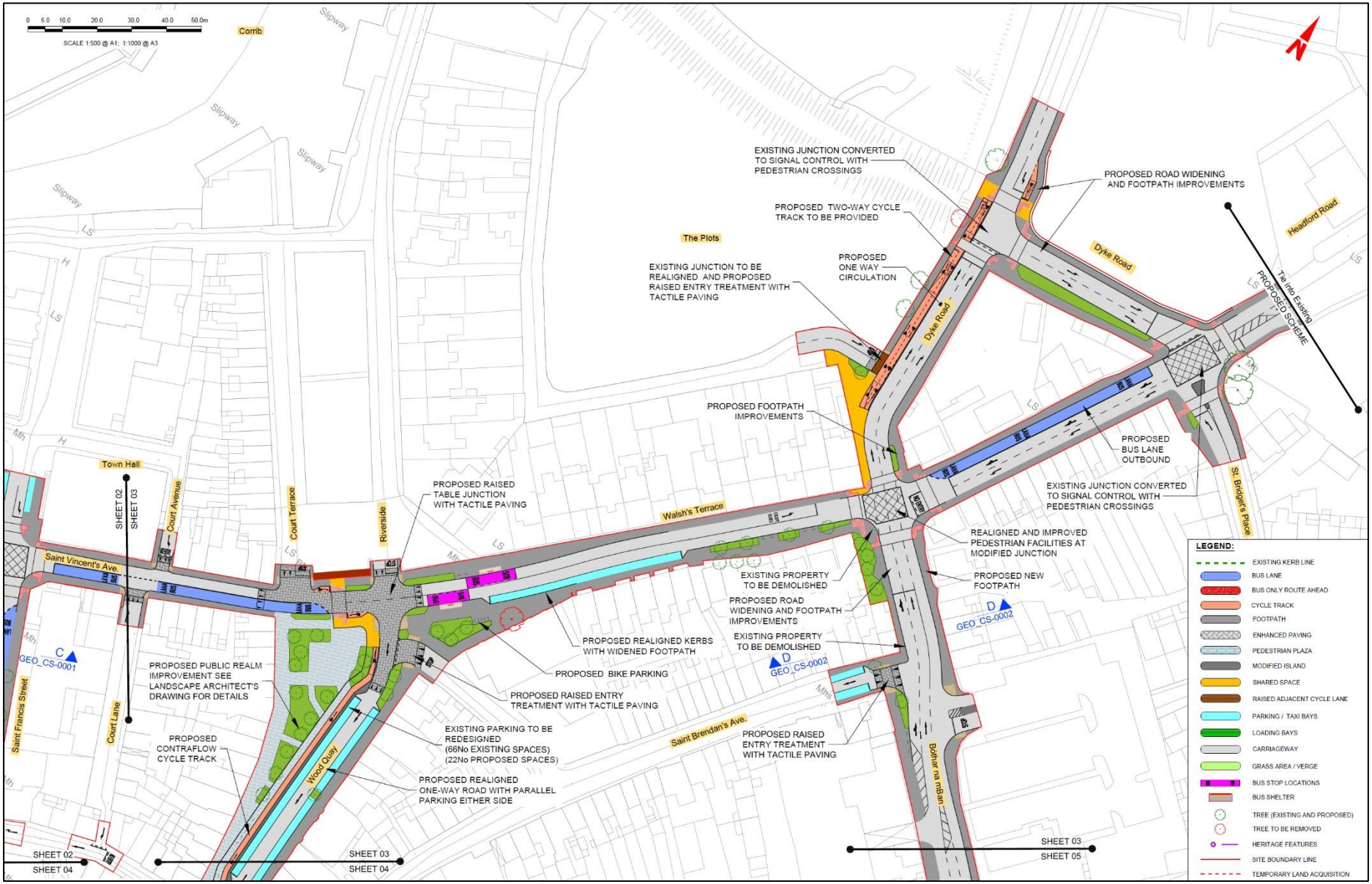

Figure 5. Plan of the Proposed Scheme 3 of 13 (note rotated N).

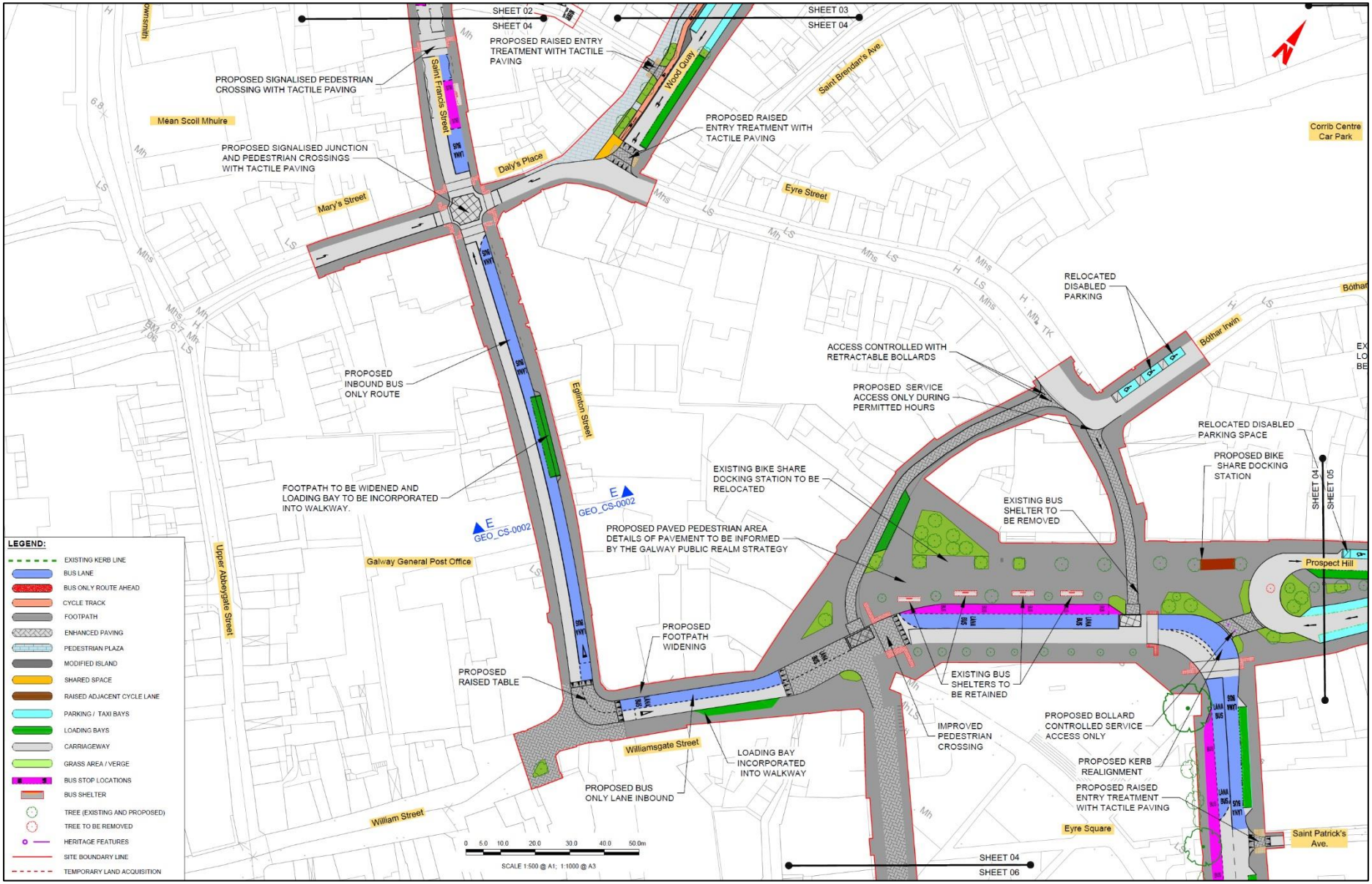

Figure 6. Plan of the Proposed Scheme 4 of 13 (note rotated N).

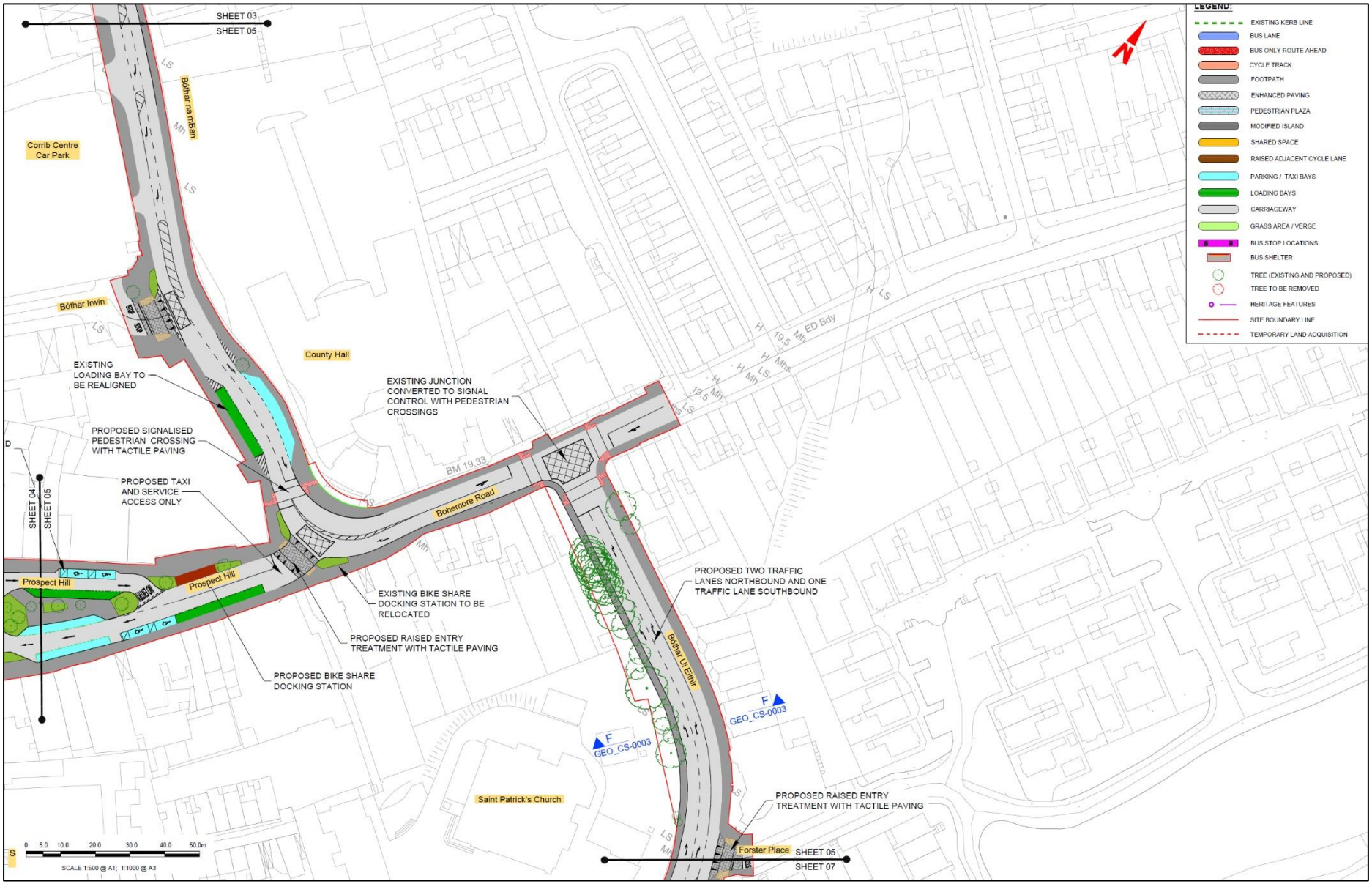

Figure 7. Plan of the Proposed Scheme 5 of 13 (note rotated N).

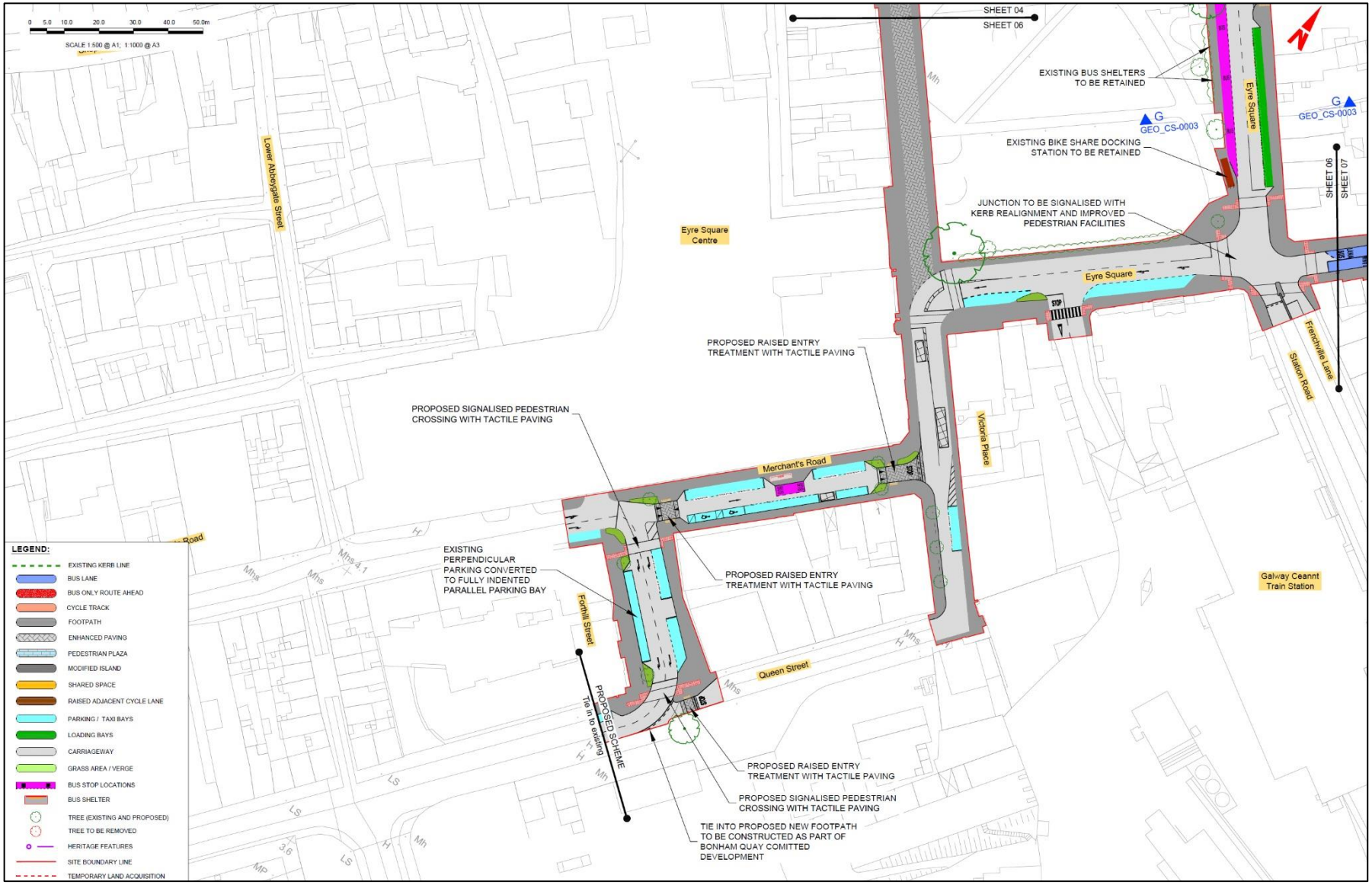

Figure 8. Plan of the Proposed Scheme 6 of 13 (note rotated N).

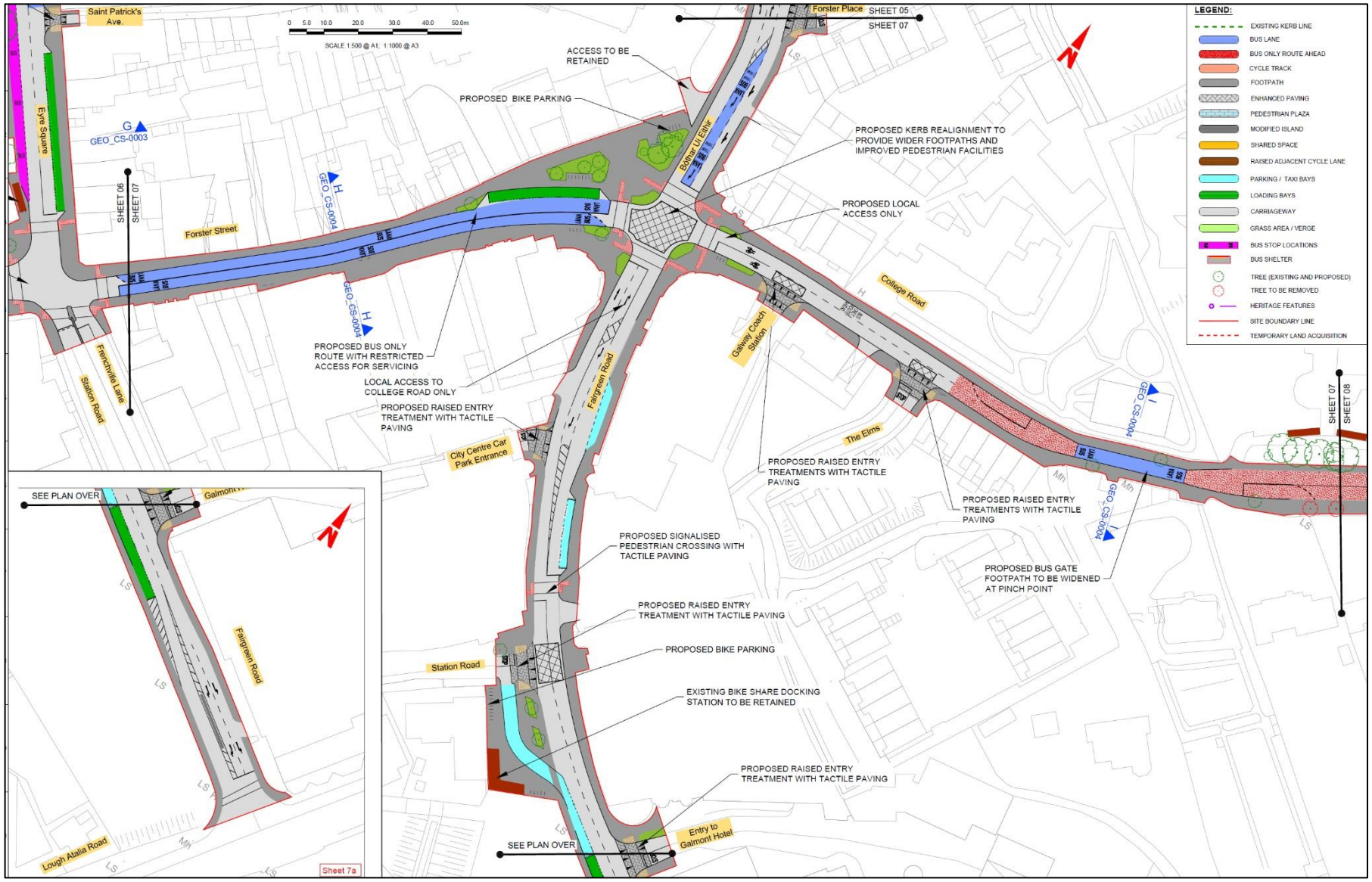

Figure 9. Plan of the Proposed Scheme 7 of 13 (note rotated N).

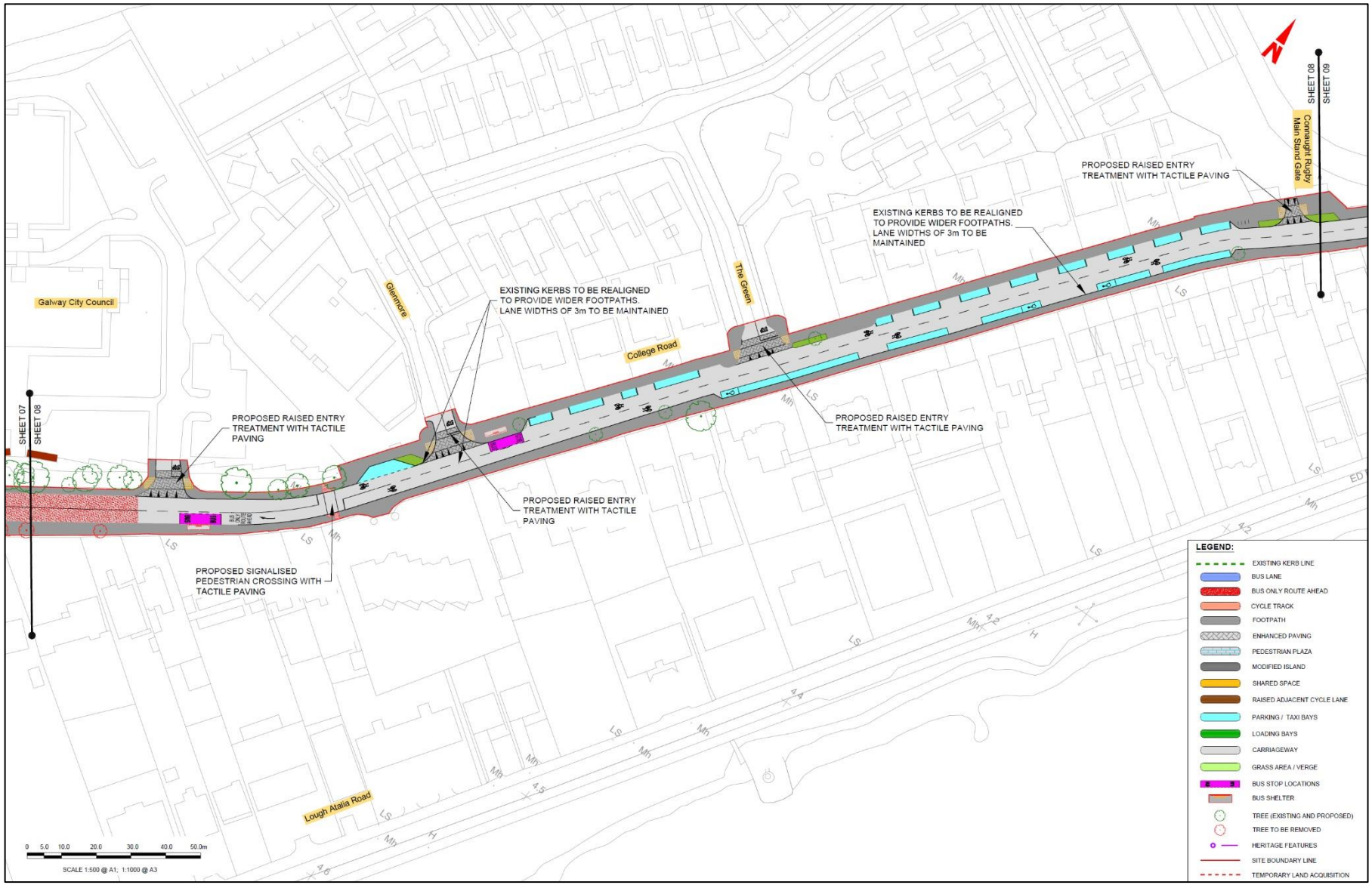

Figure 10. Plan of the Proposed Scheme 8 of 13 (note rotated N).

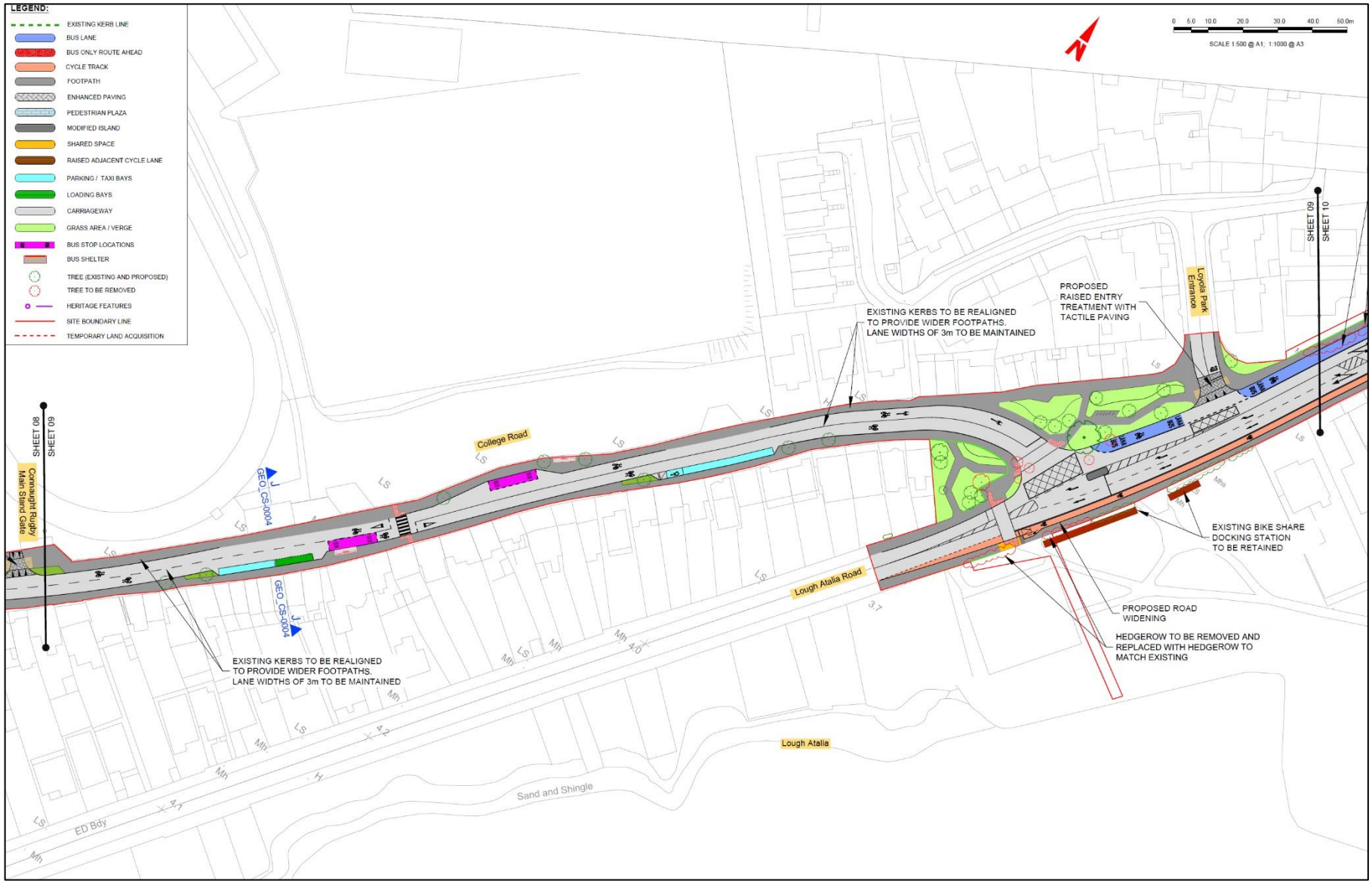

Figure 11. Plan of the Proposed Scheme 9 of 13 (note rotated N).

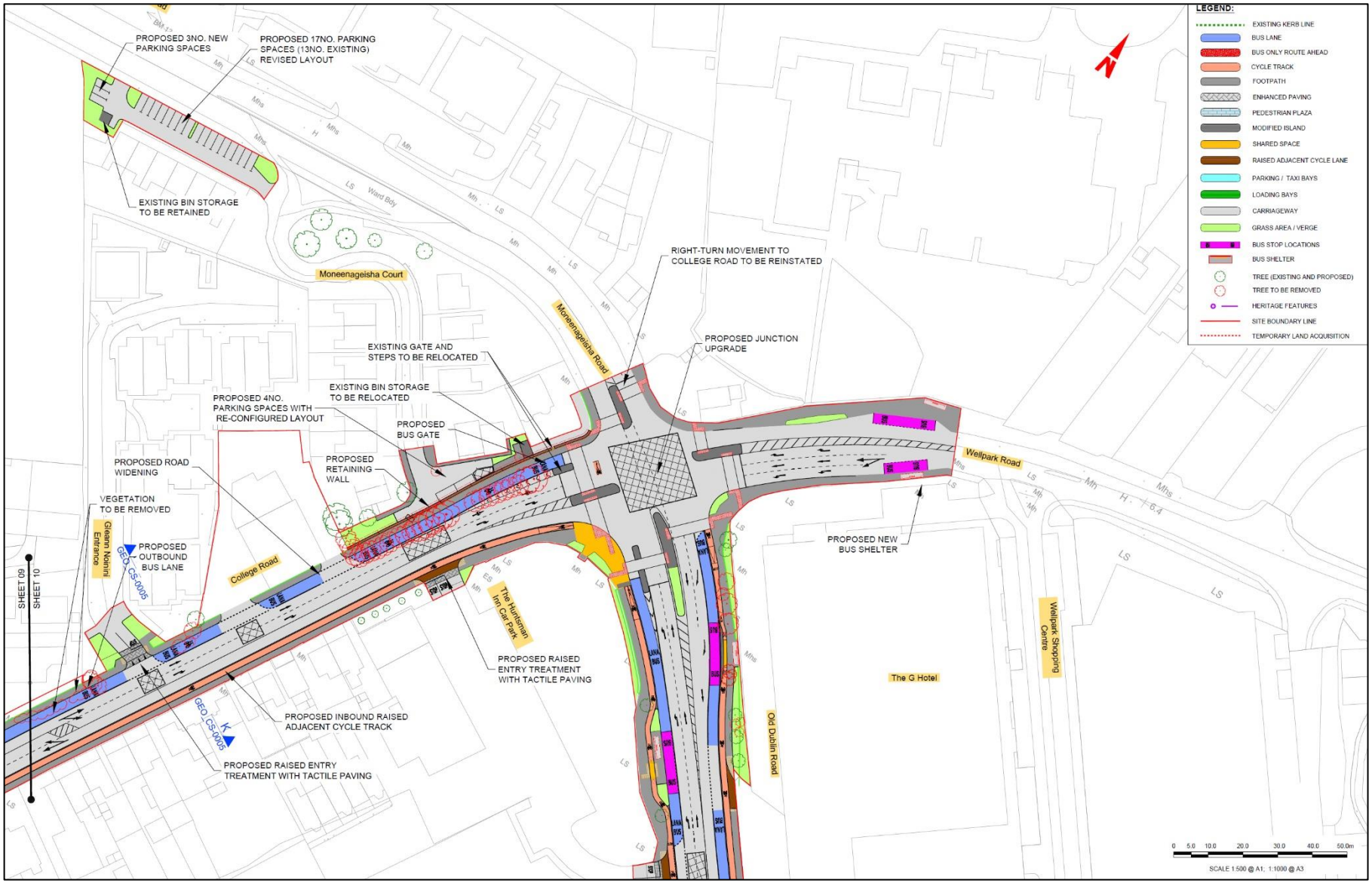

Figure 12. Plan of the Proposed Scheme 10 of 13 (note rotated N).

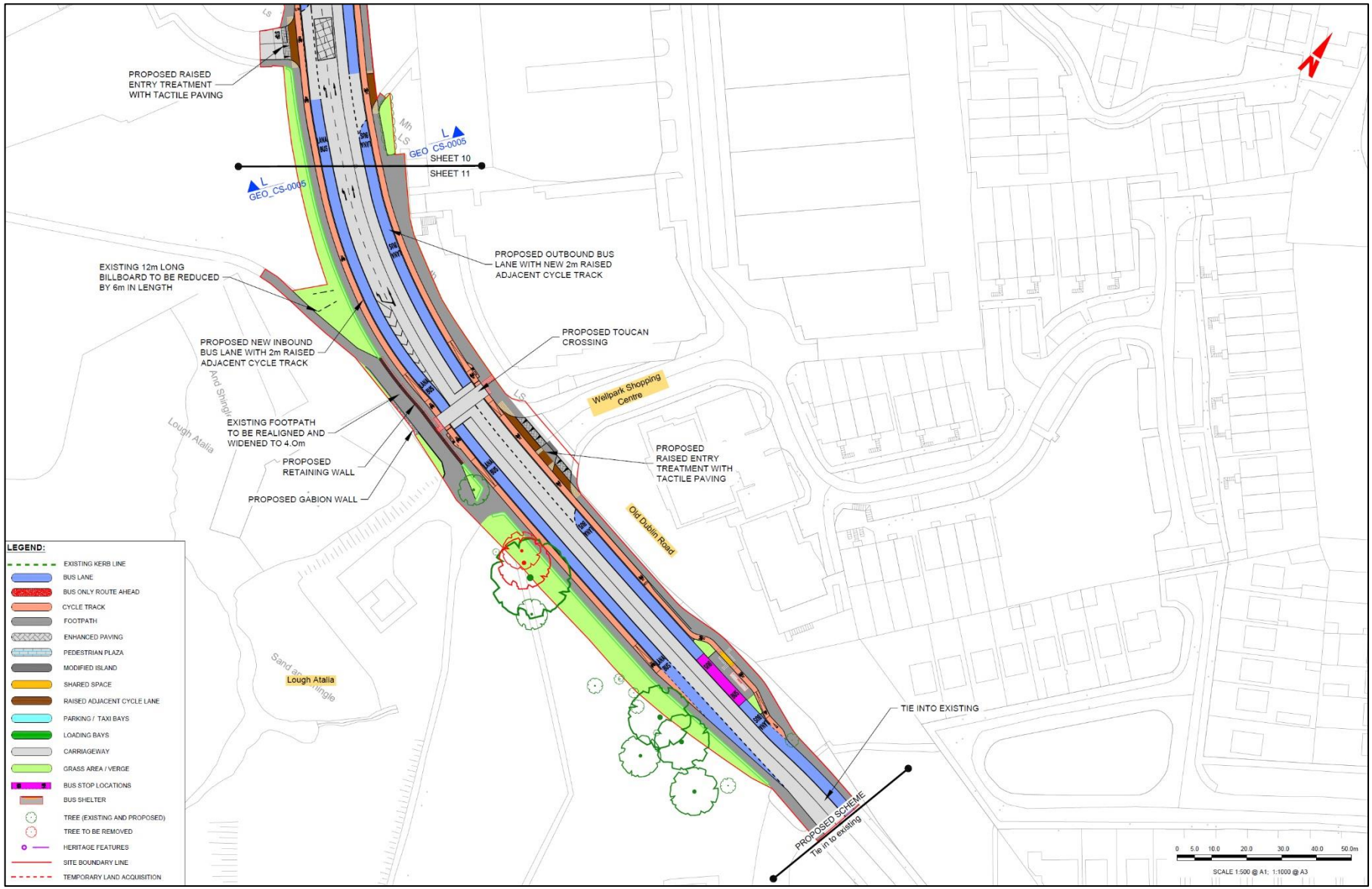

Figure 13. Plan of the Proposed Scheme 11 of 13 (note rotated N).

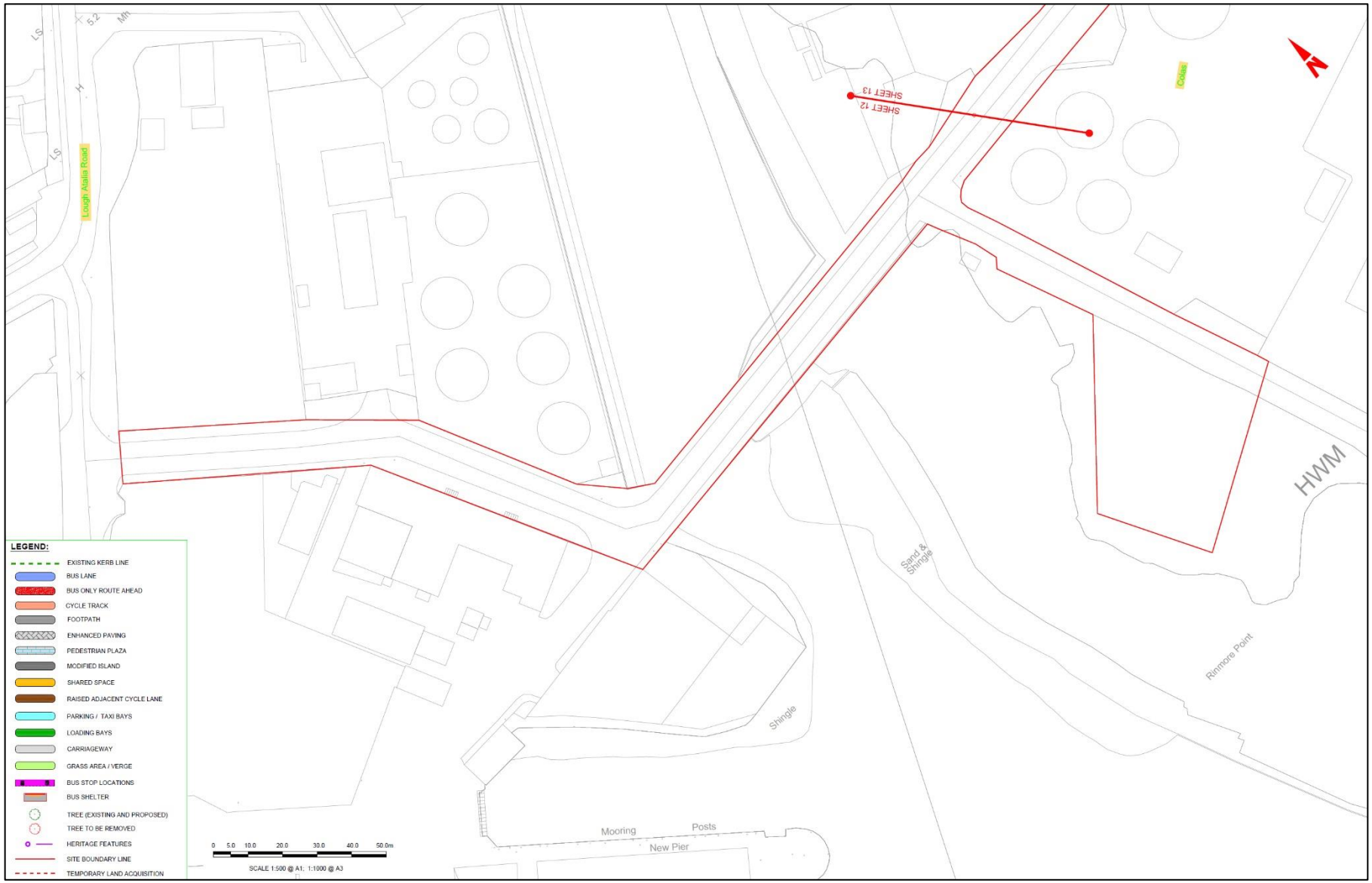

Figure 14. Plan of the Proposed Scheme 12 of 13 (note rotated N).

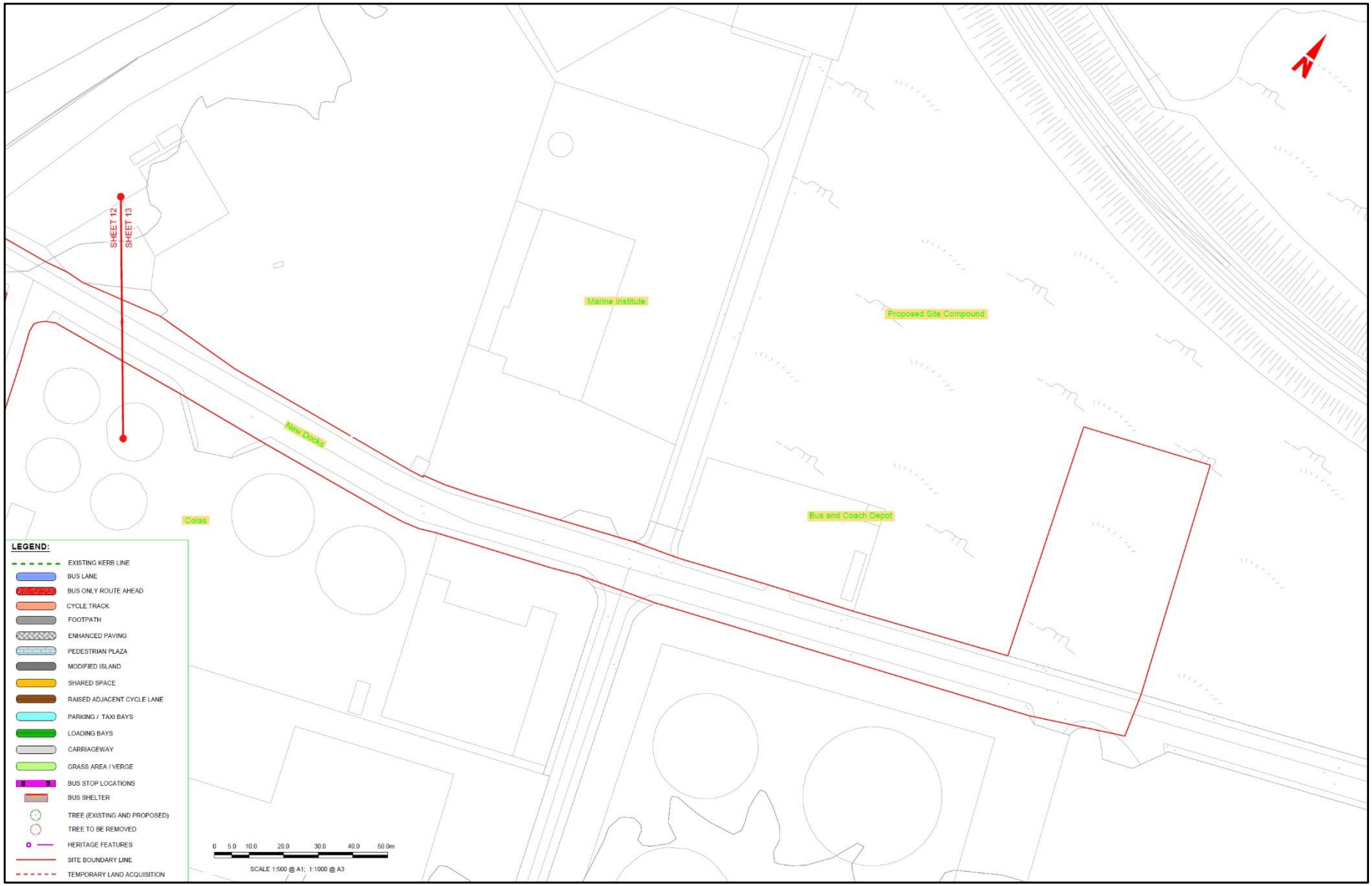

Figure 15. Plan of the Proposed Scheme 13 of 13 (note rotated N).

1.8. Construction Environmental Management

A Construction Environmental Management Plan (CEMP) has been prepared to manage the effects of construction activities associated with the development project. The CEMP is attached as **Appendix 1** to this NIS. The NIS is a standalone document that accompanies the consent application.

The CEMP sets out the principles to be adhered to and outlines measures that will be implemented during the construction of the Proposed Scheme to ensure that potential environmental effects and disturbance will be minimised or eliminated.

The measures will accord with the principles set out in industry guidelines including CIRIA's report 'C532: Control of water pollution from construction sites'.

2. Stage 1 – Screening for AA

A Report for AA Screening was undertaken and the following is taken from that document.

When screening the project, there are two possible outcomes:

- the project poses no potential for a likely significant effect and as such requires no further assessment; and
- the project has potential to have likely significant effect (or this is uncertain) unless mitigation measures are applied, and therefore an AA of the project is necessary.

If it cannot be excluded on the basis of objective information that the Proposed Scheme, individually or in combination with other plans or projects, will have a significant effect on a European site then it is necessary to carry out a Stage 2 appropriate assessment under section 177V of the Planning Acts.

A zone of influence (ZoI) of a proposed project is the geographical area over which it could significantly affect the receiving environment, including the Qualifying Interests of a European site. In accordance with the OPR Practice Note, PN01, the ZoI should be established on a case-by-case basis using the Source- Pathway-Receptor framework.

The European Commission's "*Assessment of plans and projects in relation to Natura 2000 sites guidance on Article 6(3) and (4) of the Methodological Habitats Directive 92/43/EEC*" published 28 September 2021 states at section 3.1.3:

> *Identifying the Natura 2000 sites that may be affected should be done by taking into consideration all aspects of the plan or project that could have potential effects on any Natura 2000 sites located*

within the zone of influence of the plan or project. This should take into account all of the designating features (species, habitat types) that are significantly present on the sites and their conservation objectives. In particular, it should identify:

- *any Natura 2000 sites geographically overlapping with any of the actions or aspects of the plan or project in any of its phases, or adjacent to them;*
- *any Natura 2000 sites within the likely zone of influence of the plan or project Natura 2000 sites located in the surroundings of the plan or project (or at some distance) that could still be indirectly affected by aspects of the project, including as regards the use of natural resources (e.g. water) and various types of waste, discharge or emissions of substances or energy;*
- *Natura 2000 sites in the surroundings of the plan or project (or at some distance) which host fauna that can move to the project area and then suffer mortality or other impacts (e.g. loss of feeding areas, reduction of home range);*
- *Natura 2000 sites whose connectivity or ecological continuity can be affected by the plan or project.*

The range of Natura 2000 sites to be assessed, i.e. the zone in which impacts from the plan or project may arise, will depend on the nature of the plan or project and the distance at which effects may occur. For Natura 2000 sites located downstream along rivers or wetlands fed by aquifers, it may be that a plan or project can affect water flows, fish migration and so forth, even at a great distance. Emissions of pollutants may also have effects over a long distance. Some projects or plans that do not directly affect Natura 2000 sites may still have a significant impact on them if they cause a barrier effect or prevent ecological linkages. This may happen, for example, when plans affect features of the landscape that connect Natura 2000 sites or that may obstruct the movements of species or disrupt the continuity of a fluvial or woodland ecosystem. To determine the possible effects of the plan or project on Natura 2000 sites, it is necessary to identify not only the relevant sites but also the habitats and species that are significantly present within them, as well as the site objectives.

The Zone of Influence may be determined by considering the Proposed Scheme's potential connectivity with European sites, in terms of:

- Nature, scale, timing and duration of all aspects of the proposed works and possible impacts, including the nature and size of excavations, storage of materials, flat/sloping sites;
- Distance and nature of potential pathways (dilution and dispersion; intervening 'buffer' lands, roads etc.); and
- Location of ecological features and their sensitivity to the possible impacts.

The potential for source pathway receptor connectivity is firstly identified through GIS interrogation and detailed information is then provided on sites with connectivity. European sites that are located within a potential Zone of Influence of the Proposed Scheme, due to a potential for connectivity, are listed in Table 1 and presented in Figures 15 to 18 below.

Table 1 European Sites located within the potential Zone of Influence [2] of the Project.

Site Code	Site name	Distance (km)[3]
000268	Galway Bay Complex SAC	0.00
000297	Lough Corrib SAC	0.00
004031	Inner Galway Bay SPA	0.00
004042	Lough Corrib SPA	2.82
004142	Cregganna Marsh SPA	7.12
002034	Connemara Bog Complex SAC	12.11
000606	Lough Fingall Complex SAC	13.20
001312	Ross Lake and Woods SAC	13.29
001926	East Burren Complex SAC	13.64

Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on 11 July 2022. This data was interrogated using GIS analysis to provide mapping, distances, locations and pathways to all sites of conservation concern including pNHAs, NHA and European sites.

The Proposed Scheme is predominantly located on and adjacent to existing roads and footpaths in the urban environment of Galway City.

In view of the nature, scale and location of the Proposed Scheme, the distance of the Proposed Scheme from the European sites concerned, it is considered that there is no pathway and therefore no potential for any likely significant effect on the following European sites:

- Lough Fingall Complex SAC
- Ross Lake and Woods SAC
- East Burren Complex SAC
- Connemara Bog Complex SAC
- Lough Corrib SPA
- Cregganna Marsh SPA

[2] All European sites potentially connected irrespective of the nature or scale of the proposed Project.

[3] Distances indicated are the closest geographical distance between the Proposed Scheme and the European site boundary, as made available by the NPWS..

In light of this, it is considered that there will be no potential for significant effects on these European sites.

There are five watercourses adjacent to the proposed works area travelling from west to east along University Road to Newtownsmith: the Eglinton Canal, the Gaol River, Persse's Distillery River (formerly called Mill Race), the Lower River Corrib and Friar's River (formerly called Waterside canal).

The Eglinton Canal and Gaol River are not designated for nature conservation but both discharge to the River Corrib downstream, see Figure 16 below.

Works in the vicinity of the Salmon Weir Bridge are considered in terms of proximity to the River Corrib. On the western side, the lower River Corrib is separated from Persse's Distillery River by an existing embankment. Similarly on the east, the Lower River Corrib is separated from Friar's River by an existing embankment. The watercourses are linked upstream and downstream.

The main channel of the lower River Corrib is designated as part of the Lough Corrib SAC (Site Code 000297) and c. 600 river metres downstream of the Salmon Weir Bridge, on the south side of Wolf Tone Bridge, the river is designated as part of Galway Bay Complex SAC (Site Code 000268).

Neither Persse's Distillery River nor Friar's River are designated for nature conservation, but both discharge to the lower River Corrib and thus the Lough Corrib SAC and the Galway Bay Complex SAC downstream of the proposed works locations.

There are no points of connectivity or pathways to European sites for the majority of works in the City centre sections of the proposed works areas.

The proposed works include the diversion of surface water drainage to Lough Atalia at the junction of College Road and Lough Atalia Road with the placement of a new drainage pipe and non-return valve to be installed at discharge point into Lough Atalia. Additionally, a new attenuation tank and petrol interceptor will need to be installed. The discharge point comprises an artificial rock armour habitat but is also the boundary of the Galway Bay Complex SAC and the Inner Galway Bay SPA.

Carriageway widening works on the Lough Atalia side of Dublin Road, between Brothers of Charity and the existing billboard adjacent to the Huntsman Inn comprises a new 4.0 m wide footway/cycleway offset approximately 0.9m from the SPA boundary opposite the Eye cinema. Due to the uncertainty of the existing wall, it is proposed to install a new retaining wall through here to support the footway/cycleway, which is approximately 1.3m above the depressed bay level. To avoid encroachment into the SPA boundary, it is proposed to retain the existing stone wall/embankment by constructing a mass concrete gravity wall in behind it. This requires the material in behind the wall to be excavated out and then backfilled with mass concrete. Due to the potential instability of the stone wall, care is required during construction to protect the existing stone wall/embankment. While the wall itself has

not been identified as being of heritage importance, the area behind it is designated as an SPA and hence all efforts will be made to avoid collapse of the existing wall/slope. This may require the installation of a temporary/sacrificial support to maintain the integrity of the slope and contain the concrete from seeping through the stone wall and into the SPA beyond. Protection from construction run-off into the SPA will also need to be implemented during construction along this section, see Figure 19 below.

The boundary of the SAC is adjacent to the southern side of the road and the artificial surfaces of the road and footpath in this area and the overlapping section of the proposed Scheme and the SAC comprises bramble scrub over a retaining wall. The seaward side of this scrub boundary is located within the Inner Galway Bay SPA and comprises components of upper salt marsh. However, the salt marsh does not correspond with any of the Annexed Qualifying Interests of the SAC; (1310 Salicornia and other annuals colonising mud and sand; 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) or 1410 Mediterranean salt meadows (*Juncetalia maritimi*).

The Project boundary is located adjacent to and outside the boundary of the Inner Galway Bay SPA at this point at Lough Atalia.

Given the proximity of the proposed works to both the Lough Corrib SAC and the Galway Bay Complex SAC and the Inner Galway Bay SPA these sites are considered further herein.

Details of the qualifying interests of Lough Corrib SAC (Site Code 000297), Galway Bay Complex SAC (Site Code 000268) and Inner Galway Bay SPA (Site Code 004031) are listed in Table 2 below, and Site Synopses are available from the NPWS website (www.npws.ie). The Qis and SCIs of the European sites may be re-confirmed by the competent authority prior to completing the assessment under Article 6(3) of the Habitats Directive.

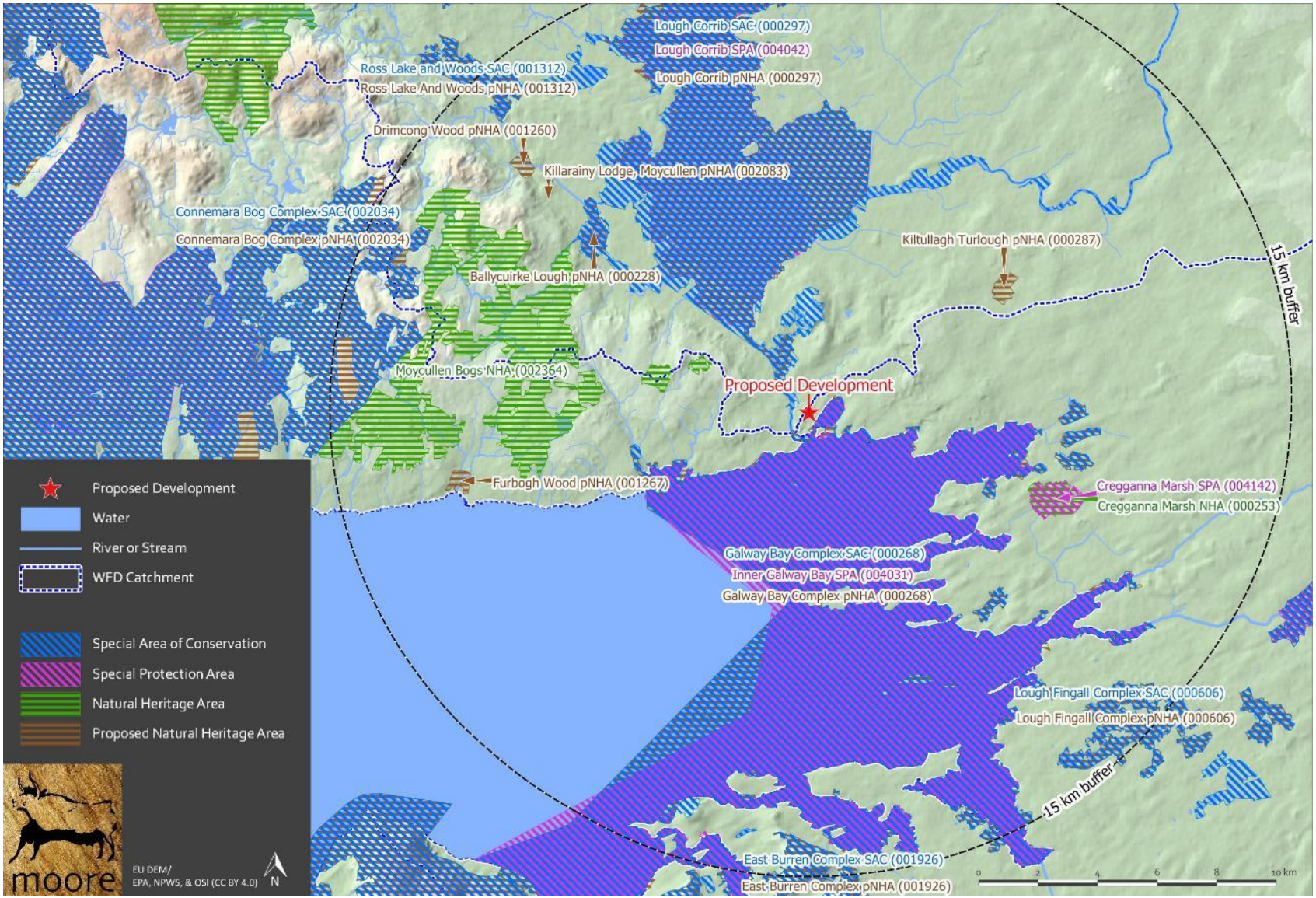

Figure 16. Showing European sites and NHAs/pNHAs in the wider potential zone of influence of the Proposed Scheme.

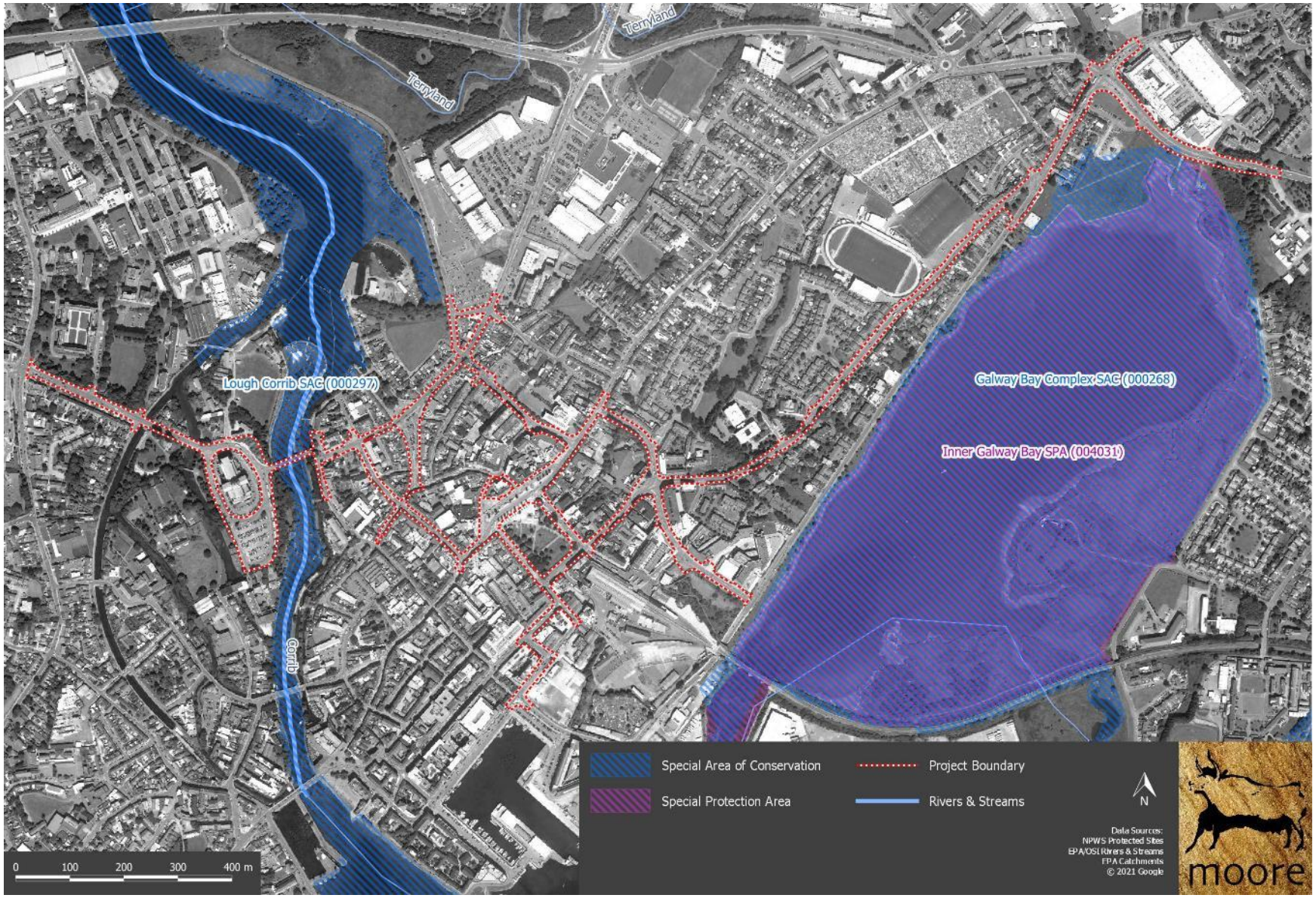

Figure 17. Detailed view of European sites in the nearer potential zone of influence of the Proposed Scheme.

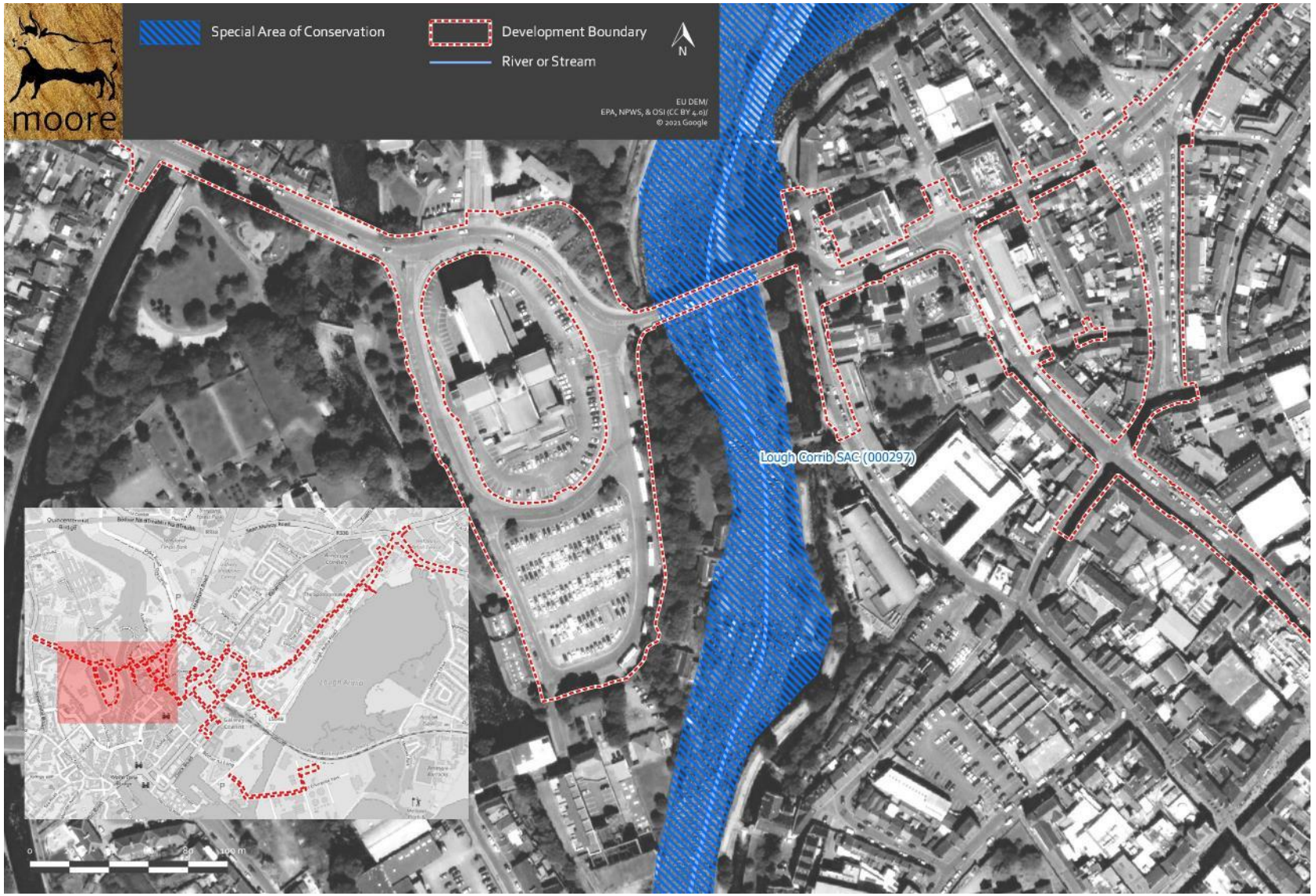

Figure 18. Detailed view of European sites in the vicinity of the Proposed Scheme where it crosses the River Corrib and associated canals.

Figure 19. Detailed view of European sites in the vicinity of the Proposed Scheme at Lough Atalia.

Table 2 Qualifying Interests and Conservation Objectives (QIs potentially affected are highlighted in green text).

Galway Bay Complex SAC (000268)			
Qualifying Interests	Key environmental conditions supporting site integrity	Conservation Objective	Potential Effects
Mudflats and sandflats not covered by seawater at low tide	Surface and marine water dependent. Low sensitivity to hydrological changes. Aquaculture, fishing and pollution.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
*Coastal lagoons	Surface, ground and marine water dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution. Changes in salinity and tidal regime	To restore favourable conservation condition.	The Conservation Objectives for Galway Bay Complex SAC note Coastal Lagoons relating to Lough Atalia and Renmore. Proposed works at College Road Service Station and a new outfall will result in direct and indirect effects that will be controlled by mitigation included in the CEMP. In the absence of mitigation measures to control the potential contamination of surface water from chemical pollution such as a hydrocarbon spill or from riparian habitat disturbance, potential effects on the priority habitat Coastal Lagoon in Lough Atalia cannot be excluded.
Large shallow inlets and bays	Surface and marine water dependent. Low sensitivity to hydrological changes. Aquaculture, fishing and pollution.	To maintain favourable conservation condition.	This habitat is found in Galway approximately 2.5 km to the south of the Proposed Scheme. This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Reefs	Marine water dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Infilling, reclamation, invasive species.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Perennial vegetation of stony banks	Marine and groundwater dependent. Sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it located at a distance of removal that it will not be affected.
Vegetated sea cliffs of the Atlantic and Baltic coasts	Sensitive to hydrological changes. Sensitive to disturbance.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of Proposed Scheme and located at a distance of removal that it will not be affected.
Salicornia and other annuals colonizing mud and sand	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.

	Infilling, reclamation, invasive species.		
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion.	To restore favourable conservation condition.	The Conservation Objectives for Galway Bay Complex SAC note potential Atlantic salt meadows noted in Lough Atalia. The targets and attributes relate to physical structure of biotic and abiotic features as well as the overall area and distribution. There will be no habitat loss or fragmentation as a result of the Proposed Scheme. Given the nature and scale of the Proposed Scheme and the pathway to this habitat via the Corrib River and tidal flow via Galway Bay into Lough Atalia, and taking account dilution factors relating to the Corrib River and the maritime environment of Galway Bay, there is no potential for adverse effects on this habitat.
Mediterranean salt meadows (*Juncetalia maritimi*)	Marine and groundwater dependent. Sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion	To restore favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
*Turloughs	Surface and Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Juniperus communis formations on heaths or calcareous grasslands	Onset of inundation or water-logging Inappropriate management.	To restore favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
*Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Alkaline fens	High water table. Ground surface water supply. Calcium-rich conditions.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
*Limestone pavements	Physical removal. Scrub encroachment	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.

Otter (*Lutra lutra*)	Prey availability. Water Quality. Riparian vegetation for breeding sites. Unhindered passage along waterways.	To restore favourable conservation condition.	Records from the NBDC show that otters have been recorded upstream of the Salmon Weir and at the mouth of the river at Nimmo's Pier. Survey work undertaken for the Proposed Scheme did not reveal any signs of otter usage at the point of discharge at Lough Atalia. There will be no direct effects on otters and no barriers to movement. There is the potential for indirect effects on water quality or prey species, which will need to be controlled by employing a Construction & Environmental Management Plan to avoid effects on water quality. In the absence of mitigation measures to control the potential contamination of surface water from contaminated surface water runoff such as chemical pollution from a hydrocarbon spill or from riparian habitat disturbance resulting in elevated suspended solids, potential effects on Otters in Lough Atalia cannot be excluded.
Harbour/Common seal (*Phoca vitulina*)	Marine water dependent. Sensitive to changes in food supply.	To maintain favourable conservation condition.	Based on review of Conservation Objectives this species has historic resting places in Lough Atalia and is regularly seen in the estuarine section of the lower River Corrib. Significant effects are unlikely on this highly mobile species. However, In the absence of mitigation measures to control the potential contamination of surface water from contaminated surface water runoff such as chemical pollution from a hydrocarbon spill or from riparian habitat disturbance resulting in elevated suspended solids, potential effects on Harbour Seals cannot be excluded.
Lough Corrib SAC (000297)			
Qualifying Interests	Key environmental conditions supporting site integrity	Conservation Objectives	Potential Effects
Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*);	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution.	To restore favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea	Surface and groundwater dependant. Highly sensitive to hydrological changes. Highly sensitive to pollution.	To restore favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.

Hard oligo-mesotrophic waters with benthic vegetation of *Chara spp*.	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution.	To restore favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	Changes in management. Changes in nutrient or base status. Moderately sensitive to hydrological change.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	Surface and groundwater dependent. Moderately sensitive to hydrological change. Changes in management. Changes in nutrient status.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Active raised bog*	Surface water supply. Low nutrient, acidic conditions to support growth of Sphagnum spp. Restricted drainage at perimeter.	To restore favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Degraded raised bogs still capable of natural regeneration	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management.	The conservation objective for this habitat is inherently linked to that of Active raised bogs and a separate conservation objective has not been set in Lough Corrib SAC.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Depressions on peat substrates of the Rhynchosporion	Surface and groundwater dependent. Low sensitivity to hydrological changes. Erosion, land-use changes.	This habitat is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Lough Corrib SAC	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
*Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
*Petrifying springs with tufa formation (Cratoneurion)	Groundwater dependent. Highly sensitive to hydrological changes. Changes in nutrient or base status.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.

Alkaline fens	High water table. Ground surface water supply. Calcium-rich conditions.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
*Limestone pavements	Physical removal. Scrub encroachment	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Old sessile oak woods with Ilex and Blechnum in the British Isles	Changes in management. Changes in nutrient or base status. Introduction of alien species.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
*Bog woodland	Surface and groundwater dependent. Highly sensitive to hydrological changes. Inappropriate management.	To maintain favourable conservation condition.	This habitat does not occur in the zone of influence of the Proposed Scheme and will not be affected.
Freshwater Pearl Mussel (*Margaritifera margaritifera*)	Surface water dependent Highly sensitive to hydrological change Very highly sensitive to pollution.	To restore favourable conservation condition.	Based on review of Conservation Objectives this species does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
White-clawed Crawfish (*Austropotamobius pallipes*)	Surface water dependent. Highly sensitive to hydrological change, Very highly sensitive to pollution.	To maintain favourable conservation condition.	This species does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Sea Lamprey (*Petromyzon marinus*)	Surface water dependent Highly sensitive to hydrological change.	To restore favourable conservation condition.	Sea Lamprey. have been recorded in the estuarine section of the lower River Corrib. In the absence of mitigation measures to control the potential contamination of surface water from contaminated surface water runoff such as chemical pollution from a hydrocarbon spill or from riparian habitat disturbance resulting in elevated suspended solids, potential effects on Sea Lamprey cannot be excluded.
Brook Lamprey (*Lampetra planeri*)	Surface water dependent Highly sensitive to hydrological change.	To restore favourable conservation condition.	Brook lamprey, a QI of the Lough Corrib SAC require freshwater mud habitats and there are none under the footprint of the proposed works. There will be no direct or indirect impacts on Brook Lamprey.
Salmon (*Salmo salar*) (only in fresh water)	Surface water dependent Highly sensitive to hydrological change	To maintain favourable conservation condition.	The River Corrib and Corrib Fishery in the main channel of the river either side of the Salmon Weir Bridge is a designated Salmon fishery. In the absence of mitigation measures to control the potential contamination of surface water from contaminated surface water runoff such as chemical pollution from a hydrocarbon spill or from riparian

			habitat disturbance resulting in elevated suspended solids, potential effects on Salmon cannot be excluded.
Lesser horseshoe bat (*Rhinolophus hipposideros*)	Suitable roosting sites and foraging sites with continuous commuting routes.	To restore favourable conservation condition.	The results of bat surveys for the N6 Transport Project have shown that this species does not occur in the development area and will not be affected. This is supported by the results of radio tracking surveys for the proposed N6 outer ring road project which have shown that this species did not forage in the urban area of Galway City to the south of the Quincentenary Bridge (Rush, T., Billington, G., 2015)[4]. Bat Surveys for the Proposed Scheme were undertaken in 2019 and no potential roosts for Lesser horseshoe bats were recorded in these surveys.
Otter (*Lutra lutra*)	Prey availability. Water Quality. Riparian vegetation for breeding sites. Unhindered passage along waterways.	To maintain favourable conservation condition.	Records from the NBDC show that otters have been recorded upstream of the Salmon Weir and at the mouth of the river at Nimmo's Pier. There will be no direct effects on otters and no barriers to movement. There is the potential for indirect effects on water quality or prey species, which will need to be controlled by employing a Construction & Environmental Management Plan to avoid effects on water quality. In the absence of mitigation measures to control the potential contamination of surface water from contaminated surface water runoff such as chemical pollution from a hydrocarbon spill or from riparian habitat disturbance resulting in elevated suspended solids, potential effects on Otters in the River Corrib cannot be excluded.
Slender Naiad (*Najas flexilis*)	Highly sensitive to hydrological changes. Highly sensitive to pollution.	To restore favourable conservation condition.	This species does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.
Slender Green Feather-moss *(Drepanocladus vernicosus)*	Highly sensitive to hydrological changes. Highly sensitive to pollution.	To maintain favourable conservation condition.	This species does not occur in the zone of influence of the Proposed Scheme and located at a distance of removal that it will not be affected.

[4] Rush, T., Billington, G. (2015). Galway bat radio-tracking project. Radio tracking studies of lesser horseshoe bat species, May 2015. Greena Ecological Consultancy. Witham Friary, Frome 2015.

Inner Galway Bay SPA (004031)			
Special Conservation Interests/QIs	Key environmental conditions supporting site integrity	Conservation Objectives	Potential Effects
Wetlands & Waterbirds	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	To maintain favourable conservation condition of birds listed and wetland habitats.	There will be no direct effects on birds of conservation concern. There is the potential for indirect effects on water quality or prey species, which will need to be controlled by employing a Construction & Environmental Management Plan to avoid effects on water quality. Potential indirect effects will be avoided by timing of works. In the absence of mitigation measures to control the potential contamination of surface water from contaminated surface water runoff such as chemical pollution from a hydrocarbon spill or from riparian habitat disturbance resulting in elevated suspended solids, potential effects on birds in Lough Atalia cannot be excluded.

The Proposed Scheme would be constructed in the existing urban areas of Galway City which is predominantly comprised of the existing buildings and hardstanding areas. The majority of proposed works are located on lands located outside and away from European sites and with no planned discharge to surface water, they do not present a concern for potential effects in these urban areas.

There is connectivity to the River Corrib at proposed works areas adjacent to the Eglinton Canal at University Road and there is planned discharge of treated surface water to Lough Atalia at Lough Atalia playground and proposed roadworks at a proximal section of the Scheme at Lough Atalia on the Dublin Road.

In the absence of mitigation measures to control the potential contamination of surface water from chemical pollution such as a hydrocarbon spill or from riparian habitat disturbance, potential effects on Otters and the priority habitat Coastal Lagoon in Lough Atalia and on Sea Lamprey and Salmon in the River Corrib cannot be ruled out.

The potential for significant adverse effects on the Lough Corrib SAC and/or Galway Bay European sites is uncertain in the absence of control of potential pollution of surface water during construction.

In the absence of mitigation measures, the potential effects on downstream European sites is uncertain. Thus, Stage 2 AA is required for the following European sites:

- Galway Bay Complex SAC (000268)
- Lough Corrib SAC (000297)

- Inner Galway Bay SPA (004031).

This NIS has been prepared for the Proposed Scheme, to inform the Stage 2 AA and is presented as follows.

3. Stage 2 – AA

This stage considers whether the Proposed Scheme, alone or in combination with other projects or plans, will have adverse effects on the integrity of a European site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The Stage 2 AA comprises a scientific examination of the plan / project and the relevant European site; to identify and characterise any possible implications for the site in view of the site's conservation objectives, structure and function; taking account of in combination effects. This NIS provides the competent authority (An Bord Pleanála) with the information necessary to undertake the AA.

3.1. Description of European Sites Potentially Affected

Potential effects on the following European sites have been identified**:**

3.1.1. Galway Bay Complex SAC [000268]

Excerpts from the NPWS Site Synopsis of the Galway Bay Complex SAC (Version date 10.12.2015) are provided as follows:

Situated on the west coast of Ireland, this site comprises the inner, shallow part of a large bay which is partially sheltered by the Aran Islands. The Burren karstic limestone fringes the southern sides and extends into the sublittoral. West of Galway city the bedrock geology is granite. There are numerous shallow and intertidal inlets on the eastern and southern sides, notably Muckinish, Aughinish and Kinvarra Bays. A number of small islands composed of glacial deposits are located along the eastern side. These include Eddy Island, Deer Island and Tawin Island. A diverse range of marine, coastal and terrestrial habitats, including several listed on Annex I of the E.U. Habitats Directive, occur within the site, making the area of high scientific importance.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1140] Tidal Mudflats and Sandflats
[1150] Coastal Lagoons*
[1160] Large Shallow Inlets and Bays
[1170] Reefs

[1220] Perennial Vegetation of Stony Banks

[1230] Vegetated sea cliffs of the Atlantic and Baltic coasts

[1310] *Salicornia* Mud

[1330] Atlantic Salt Meadows

[1410] Mediterranean Salt Meadows

[3180] Turloughs*

[5130] Juniper Scrub

[6210] Orchid-rich Calcareous Grassland*

[7210] *Cladium* Fens*

[7230] Alkaline Fens

[8240] Limestone Pavement*

[1355] Otter (*Lutra lutra*)

[1365] Common (Harbour) Seal (*Phoca vitulina*)

This large coastal site is of immense conservation importance, with many habitats listed on Annex I of the E.U. Habitats Directive, four of which have priority status (lagoon, Cladium fen, turlough and orchid-rich calcareous grassland). The examples of shallow bays, reefs, lagoons and saltmarshes found within this site are amongst the best in the country. The site supports an important Common Seal colony and a breeding Otter population (Annex II species), and six regular Annex I E.U. Birds Directive species. The site also has four Red Data Book plant species, plus a host of rare or scarce marine and lagoonal animal and plant species.

3.1.2. Lough Corrib SAC [000297]

Excerpts from the NPWS Site Synopsis of the Lough Corrib SAC (Version date 01.12.2015) are provided as follows:

Lough Corrib is situated to the north of Galway city and is the second largest lake in Ireland, with an area of approximately 18,240 ha (the entire site is 20,556 ha). The lake can be divided into two parts: a relatively shallow basin, underlain by Carboniferous limestone, in the south, and a larger, deeper basin, underlain by more acidic granite, schists, shales and sandstones to the north. The surrounding lands to the south and east are mostly pastoral farmland, while bog and heath predominate to the west and north. A number of rivers are included within the cSAC as they are important for Atlantic Salmon. These rivers include the Clare, Grange, Abbert, Sinking, Dalgan and Black to the east, as well as the Cong, Bealanabrack, Failmore, Cornamona, Drimneen and Owenriff to the west. In addition to the rivers and lake basin, adjoining areas of conservation interest, including raised bog, woodland, grassland and limestone pavement, have been incorporated into the site.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[3110] Oligotrophic Waters containing very few minerals
[3130] Oligotrophic to Mesotrophic Standing Waters
[3140] Hard Water Lakes
[3260] Floating River Vegetation
[6210] Orchid-rich Calcareous Grassland*
[6410] Molinia Meadows
[7110] Raised Bog (Active)*
[7120] Degraded Raised Bog
[7150] Rhynchosporion Vegetation
[7210] Cladium Fens*
[7220] Petrifying Springs*
[7230] Alkaline Fens
[8240] Limestone Pavement*
[91A0] Old Oak Woodlands
[91D0] Bog Woodland*
[1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)
[1092] White-clawed Crayfish (*Austropotamobius pallipes*)
[1095] Sea Lamprey (*Petromyzon marinus*)
[1096] Brook Lamprey (*Lampetra planeri*)
[1106] Atlantic Salmon (*Salmo salar*)
[1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*)
[1355] Otter (*Lutra lutra*)
[1393] Slender Green Feather-moss (*Drepanocladus vernicosus*)
[1833] Slender Naiad (*Najas flexilis*)

Lough Corrib is one the best examples of a large lacustrine catchment system in Ireland, with a range of habitats and species still well represented. These include 15 habitats which are listed on Annex I of the E.U. Habitats Directive, six of which are priority habitats, and nine species which are listed on Annex II. The lake is also internationally important for birds and is designated as a Special Protection Area.

3.1.3. Inner Galway Bay SPA [004031]

Excerpts from the NPWS Site Synopsis of the Inner Galway Bay SPA (Version date 25.10.2019) are provided as follows:

Inner Galway Bay SPA is a very large, marine-dominated site situated on the west coast of Ireland. The inner bay is protected from exposure to Atlantic swells by the Aran Islands and Black Head. Subsidiary bays and inlets (e.g. Poulnaclough, Aughinish and Kinvarra Bays) add texture to the patterns of water movement and sediment deposition, which lends variety to the marine habitats and communities. The terraced Carboniferous (Viséan) limestone platform of the Burren sweeps down to the shore and into the sublittoral. The long shoreline is noted for its diversity, and comprises complex mixtures of bedrock shore, shingle beach, sandy beach and fringing salt marshes. Intertidal sand and mud flats occur around much of the shoreline, with the largest areas being found on the sheltered eastern coast between Oranmore Bay and Kinvara Bay. A number of small islands and rocky islets in the Bay are included within the site.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Great Northern Diver, Cormorant, Grey Heron, Light-bellied Brent Goose, Wigeon, Teal, Shoveler, Red-breasted Merganser, Ringed Plover, Golden Plover, Lapwing, Dunlin, Bar-tailed Godwit, Curlew, Redshank, Turnstone, Black-headed Gull, Common Gull, Sandwich Tern and Common Tern. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

3.2. Description of the Existing Environment

In general, there are few natural habitats in the majority of the Proposed Scheme area. They have either been modified or are artificial in nature in the urban context of Galway City. The main natural habitats of conservation concern are the River Corrib and Lough Atalia, see Figures 2 and 17.

The following is an overview of the main habitat types present in proposed works areas. Detailed habitat descriptions are provided in areas that either intersect or have hydrological connectivity with European sites. Detailed Habitat maps are provided below for each of these areas. Habitats are classified under the Fossitt codes (Fossitt, 2000).

3.2.1. Habitats & Flora

The Proposed Scheme would be constructed in the existing urban areas of Galway City which is predominantly comprised of the existing buildings and hardstanding areas ‘Buildings and artificial surfaces’ (BL3) which comprise the roads, paths, cycle lanes, laybys, parking areas and artificial surfaces of the City. These urban areas are not mapped as they are presented in the project figures in Figure 12.1 in Volume 3 (Figures) of this EIAR.

There were no rare or protected flora recorded in the Project area.

Specific detailed surveys of areas of the Eglinton Canal, the Galway Harbour Enterprise Park and amenity grassland at Lough Atalia are presented in detailed habitat maps below.

University Road

Along University Road (from the junction with Newcastle Road to the Salmon Weir Bridge), the Proposed Scheme works will involve footpath widening, provision of an entry treatment at the entrance to NUIG, provision of two raised tables along the route at Canal Road Upper and Fisheries Field and the provision of two new signalised pedestrian crossings. Between the entrance to Fisheries Field and the Salmon Weir Bridge, it is proposed to install a bus gate and to designate the carriageway as a time-regulated bus lane in both directions.

The predominant habitat present is Buildings and artificial surfaces (BL3). Adjoining lands in NUIG comprise Amenity grassland (GA2), Mixed broadleaved woodland (WD1) and Flower beds and borders (BC4). These latter habitats will not be affected, see Photo 1 below.

The immediate aquatic environment in the Eglinton Canal adjacent to the Proposed Scheme site does not contain any designated habitats but is important in terms of water quality as a habitat for salmonids and otters.

Photo 1. View of University Road (07/04/20) from the Eglinton Canal bridge at Ward's shop looking West.

University Road crosses the Eglinton Canal (FW3) at the intersection of Canal Road Upper and the entrance to NUIG. It has been established that while the canal is not designated as part of the Lough Corrib SAC, it discharges to the River Corrib downstream at Wolf Tone Bridge and at the Claddagh Basin over 800m downstream. There are records for otters at the rear of the Ryan Institute building in NUIG upstream of the bridge at Ward's Shop.

Excavation and removal of the existing footpath is proposed over the bridge and replacement with a new concrete footpath. Excavation of the existing footpath and part of the existing road carriageway surface, to a depth of 100mm – 150mm approx. is expected. The existing road surface will be removed using a mechanical planer. Immediately adjacent to the bridge, a new raised table is the be constructed from bituminous products. This will require the removal of a maximum of 100mm of existing road surface and replacement with approximately 200-250mm of new bituminous material. No trenching is anticipated to be required cross the bridge or in close proximity to the bridge or watercourse.

There are no planned discharges to surface water. However, there are openings from the road to the Eglinton Canal particularly at Ward's Corner with connectivity to the River Corrib downstream and the potential for contaminated surface water runoff to the canal is uncertain. The Eglinton Canal is not monitored by the EPA for water quality.

However, the main channel of the River Corrib at the Salmon Weir Bridge sampling point returned a Q4 value for the most recent sampling period, 2021, indicating Good water quality status (https://gis.epa.ie/EPAMaps/).

Gaol Road and Galway Cathedral

To the west of Galway Cathedral, on Gaol Road, the works involve footpath widening at the junction with University Road and to the south on Gaol Road the works involve re-development of the car and coach parking area to the south of Galway Cathedral. To the east of Galway Cathedral, the works involve the closure of the existing carriageway and creation of a pedestrianised public space.

The area to the east of Galway Cathedral is to be closed to vehicular traffic and designated as a public pedestrian space, and the carriageway and footpaths that will ultimately become part of the public space will be removed and/or regraded, with a new paved area installed to connect with the existing walls both to the east (adjacent to Persse's Distillery River) and to the west (adjacent to the boundary wall of Galway Cathedral). This will require the removal of the existing bituminous layers on the road and replacement with new materials.

University Road crosses the Gaol River which is a branch of the Eglinton Canal (FW3), Photo 2. The predominant habitat present around the Cathedral is Buildings and artificial surfaces (BL3). Adjoining lands in NUIG comprise Amenity grassland (GA2) of the Fisheries Field, Mixed broadleaved woodland

(WD1) along the Persse's Distillery River and Flower beds and borders (BC4). These latter habitats will not be affected.

Photo 2. View of Gaol River looking North toward the Ryan Institute NUIG from Beggars Bridge (07/04/20).

Salmon Weir Bridge

On the Salmon Weir Bridge, the works include widening the existing footpath on the northern side of the bridge and the removal of the footpath on the southern side of the bridge and replacing it with a rubbing strip. Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths.

At the time of writing (August 2022) preparation work had commenced on the Salmon Weir Pedestrian Bridge at the Cathedral side of the river and several trees visible in the aerial photo (Figure 19 below) had been removed as part of that approved Project.

The main channel of the river is comprised of bedrock, boulders and cobbles which can be seen during the summer months. During the winter months, the powerful flow and substantially increased volume of the river prevents the establishment of Annexed habitats. As mentioned above, the main channel of the River Corrib at the Salmon Weir Bridge sampling point returned a Q4 value for the most recent sampling period, 2021, indicating Good water quality status. The river may be considered 'Lowland' (FW2) but varies between depositing above the salmon weir and eroding downstream of the weir

depending on spate conditions. The Proposed Scheme crosses at the Salmon Weir Bridge in the eroding section.

Newtownsmith/Waterside

The works at this location will involve the permanent closure of Waterside as it approaches St. Vincent's Avenue from the north (with the resultant space used to create a public space), and the narrowing of Newtownsmith as it approaches St. Vincent's Avenue from the south (reduced to a single northbound traffic lane, with resultant wider footpaths). The project boundary takes in a small area of Amenity Grassland (GA2) adjacent to the river at Waterside, see Figure 19 below. The adjacent area of the River Corrib is part of the Lough Corrib SAC.

The predominant habitat present Newtownsmith is Buildings and artificial surfaces (BL3) and a small patch of Amenity Grassland (GA2) adjacent to the river at Waterside, see Photo 12.3 below. One newly sprouting London Plane (*Platanus x hispanica*) (c.f. photo insert from 07/04/20) and a compromised Rowan (*Sorbus aucuparia*) are the only trees in this area which will be removed. A single Lime tree at the northern end of a line of semi-mature Lime trees has been removed as part of the Salmon Weir Pedestrian Bridge Project. There are no plans to remove the remaining trees for the subject application.

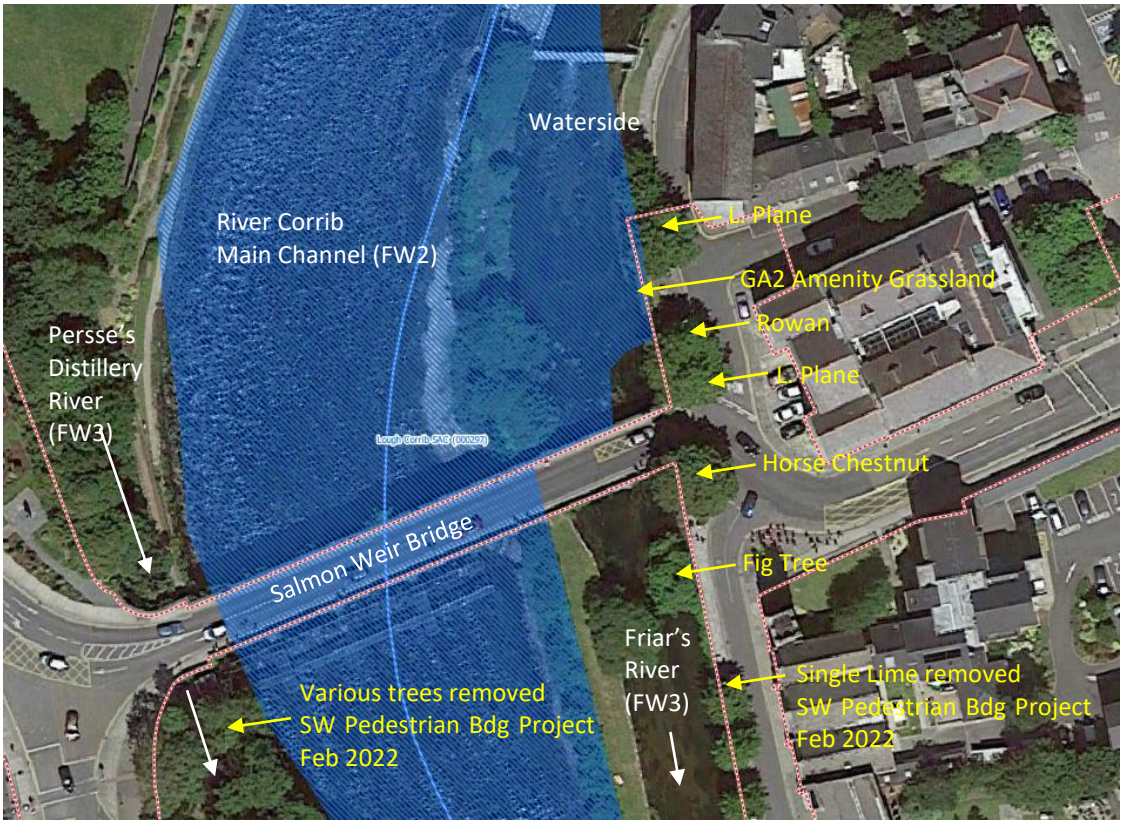

Figure 20. Showing the Project Boundary in detail and Habitats at Waterside with Lough Corrib SAC Hatched in Blue.

Photo 3. View of Amenity grassland at Waterside on 18/10/21 (inset 07/04/20).

Dyke Road/Headford Road

The project boundary extends for a short distance north along the Dyke Road past the former Clifden Railway Line embankment. The works proposed are pavement improvement and there will be no direct effects on the section of Lough Corrib SAC which encompasses the reedbed to the east of the Commercial Boat Club, c. 9m from the Dyke Road, see Figure 20 and Photo 4 below.

The locations of two residences to be demolished are indicated at the Headford Road and St. Brendan's Avenue.

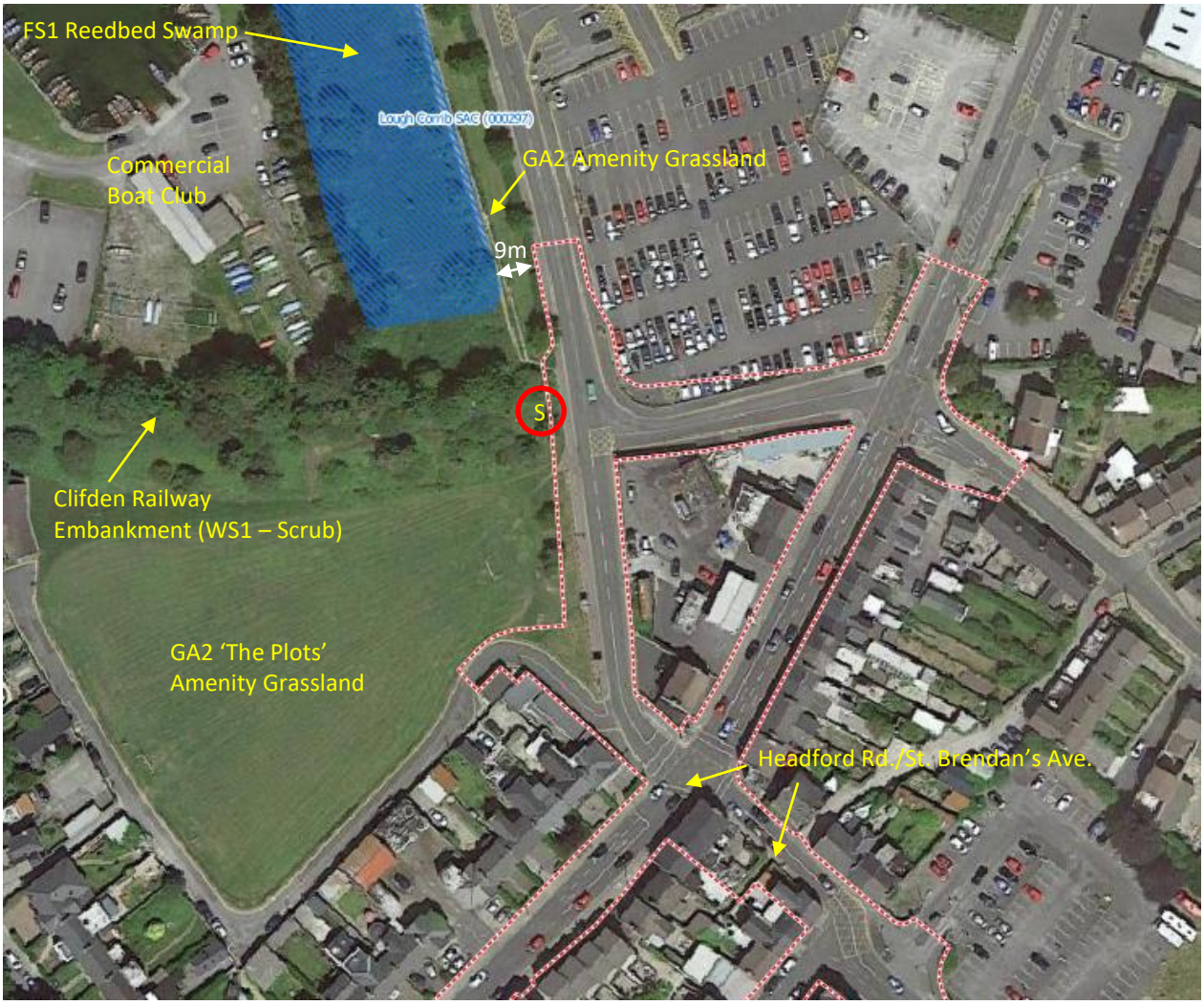

Figure 21. Showing the Project Boundary in detail and Habitats at the Dyke Road with Lough Corrib SAC Hatched in Blue Corresponding to Reedbed and Trees marked for removal (S = Sycamore).

Photo 4. View of Amenity Grassland at the Dyke Road adjacent to the SAC Area (07/04/20).

City Centre

The predominant habitat present in the following areas is Buildings and artificial surfaces (BL3). There are no natural habitats and there are no predicted effects on ecology in these areas:

- St. Vincent's Avenue/Walsh's Terrace;
- St. Francis Street/Eglinton Street/Williamsgate Street;
- Woodquay/Daly's Place/Mary Street;
- Bóthar na mBan/St. Brendan's Avenue;
- Prospect Hill;
- Eyre Square North/Eyre Square East/Eyre Square South;
- Victoria Place/Merchant's Road/Queen Street;
- Forster Street;
- College Road/Forster Street/Fairgreen Road/Bóthar Uí hEithir junction;
- Bóthar Uí hEithir;
- Fairgreen Road;

The project boundary extends to the eastern end of Fairgreen Road at the junction of Lough Atalia Road. The Galway Bay Complex SAC and Inner Galway Bay SPA extend into Lough Atalia in this area but the SAC/SPA site boundaries are c.30m from the project boundary in this area and there will be no direct or indirect effects in this area).

College Road/Lough Atalia Road junction;

The junction of College Road/Lough Atalia Road is to be realigned into a standard, signal controlled, T-junction arrangement, with a reduced junction footprint. The College Road (from City Hall) arm of the junction will be the minor arm of the 'T' arrangement. Existing traffic islands within the existing junction are to be removed, and the College Road approach to the junction realigned to route through the existing grassed area between College Road and Lough Atalia Road. The new T-junction will be signalised. The existing junction area that becomes redundant will be used to provide new or widened footpaths and provision of new landscaped areas. The existing entrance to Loyola Park will be retained in its current location, but altered to a priority controlled access with a new entry treatment and kerblines.

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the new drainage network.

A new drainage pipe and non-return valve to be installed at discharge point into Lough Atalia at this location adjacent to the eastern perimeter of Lough Atalia Playground. The maximum depth of trench excavation required to install the new pipe, gully post and new connection pipes is 2.2m. Additionally, a new attenuation tank and petrol interceptor will need to be installed, which will require excavation of approximately 3.5m -3.75m for installation.

The playground, adjacent amenity grassland and rock armour shoreline were surveyed and are not considered SAC habitat, notwithstanding that they are located partly within the NPWS mapping for the SAC.

The ecological boundary of this SAC may be considered to be co-aligned with the Inner Galway Bay SPA boundary in this area which in coastal areas corresponds to the Mean High Water Mark.

Lough Atalia is included in the Galway Bay Complex SAC as a Coastal Lagoon [1150]. Coastal lagoons are priority habitats under the Habitats Directive.

The existing habitat on the western perimeter of Lough Atalia Playground surveyed on 20-21 January 2022 is Amenity grassland (GA2) which surrounds the Playground area (BL3). The shoreline curves around to a bend in the rock armour corresponding to the end of the propriety garden or plot at the eastern end of Lough Atalia Road where the existing outfall is located. As mentioned, the shoreline is comprised of rock armour, an artificial shoreline placed in the late 1990s, see Figure 21 and Photo 5.

Lough Atalia is considered in terms of water quality under as a Transitional Water Body and is assigned an EPA status for the period 2018-2020 of ‘Unpolluted’.

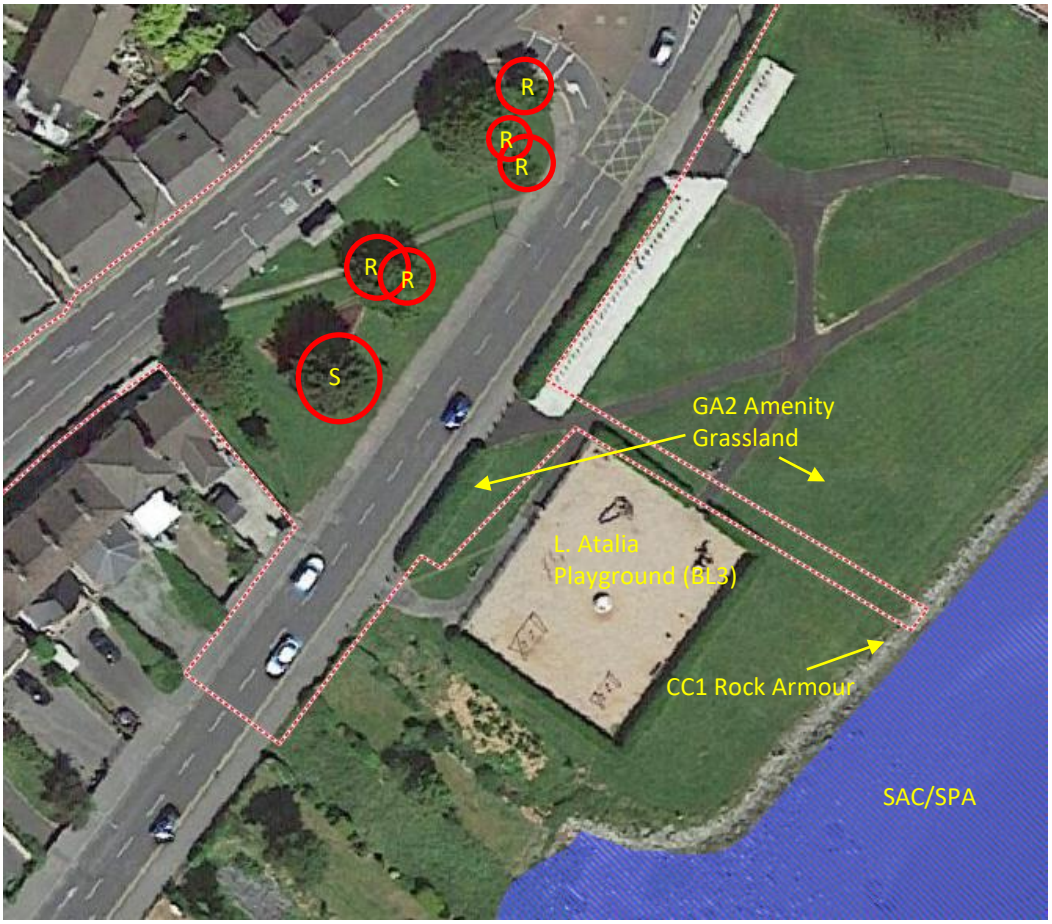

Figure 22. Showing the project boundary in detail and habitats at the proposed surface water discharge point at Lough Atalia Playground and trees marked for removal (S = Sycamore, R = Rowan).

Photo 5. Showing the habitat types at Lough Atalia Playground and adjacent amenity grassland adjacent to Lough Atalia.

The lower shore is covered by seawater at hightide and at low tide presents as soft mud with occasional weed covered rocks corresponding to Mixed sediment shore (LS5). The rock armour was searched for possible otter holt or resting habitat during surveys in March 2022 but found to be based on poured concrete with no potential in this regard. The proposed works refer to the removal of the upper sections of the rock armour to facilitate the placement of a new outfall after interception.

R338 Dublin Road

The works on the R338 Dublin Road comprise the installation of inbound and outbound bus lanes, raised adjacent cycle lanes and footpaths on both sides of the road, extending for approximately 350m east of the Moneenageisha Road. This is to be achieved via a combination of carriageway widening, re-purposing of existing traffic lanes and setting back the existing footpath. An entry treatment is proposed at the entrance to the Huntsman Inn.

Approaching the junction at Moneenageisha, footpath widening is proposed as part of the tightening of the entrance to the junction (removal of the left-slip to College Road, etc.).

Footpath widening works will require the existing footpaths to be broken out, and the bituminous layers of the road carriageway where widening is proposed to be removed, and the new widened footpath installed. This will require excavations of approximately 300mm of the existing road and footpaths. Drainage gullies will be relocated to the new kerb edge and will connect back to the existing drainage network. The maximum depth of trench excavation required to install gully post and new connection pipes is 1.2m. Other utilities, where present will be retained within the new footpath.

The predominant habitat present on the R338 Dublin Road is Buildings and artificial surfaces (BL3). Lough Atalia is included in the Galway Bay Complex SAC as a Coastal Lagoon [1150]. Coastal lagoons are priority habitats under the Habitats Directive.

Carriageway widening works on the Lough Atalia side of Dublin Road, between Brothers of Charity and the existing billboard adjacent to the Huntsman Inn comprises a new 4.0 m wide footway/cycleway offset approximately 0.9m from the SPA boundary opposite the Eye cinema. Due to the uncertainty of the existing wall, it is proposed to install a new retaining wall through here to support the footway/cycleway, which is approximately 1.3m above the depressed bay level. To avoid encroachment into the SPA boundary, it is proposed to retain the existing stone wall/embankment by constructing a mass concrete gravity wall in behind it. This requires the material in behind the wall to be excavated out and then backfilled with mass concrete. Due to the potential instability of the stone wall, care is required during construction to protect the existing stone wall/embankment. The area behind the wall is designated as an SPA and hence all efforts will be made to avoid collapse of the existing wall/slope. This may require the installation of a temporary/sacrificial support to maintain the integrity of the slope and contain the concrete from seeping through the stone wall and into the SPA beyond. Protection

from construction run-off into the SPA will be implemented during construction along this section, see Figure 22.

The boundary of the SAC is adjacent to the southern side of the road and the artificial surfaces of the road and footpath in this area and the overlapping section of the Proposed Scheme and the SAC comprises bramble scrub over a retaining wall. The seaward side of this scrub boundary is located within the Inner Galway Bay SPA and comprises components of upper salt marsh. However, the salt marsh does not correspond with any of the Annexed Qualifying Interests of the SAC; (1310 Salicornia and other annuals colonising mud and sand; 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) or 1410 Mediterranean salt meadows (*Juncetalia maritimi*).

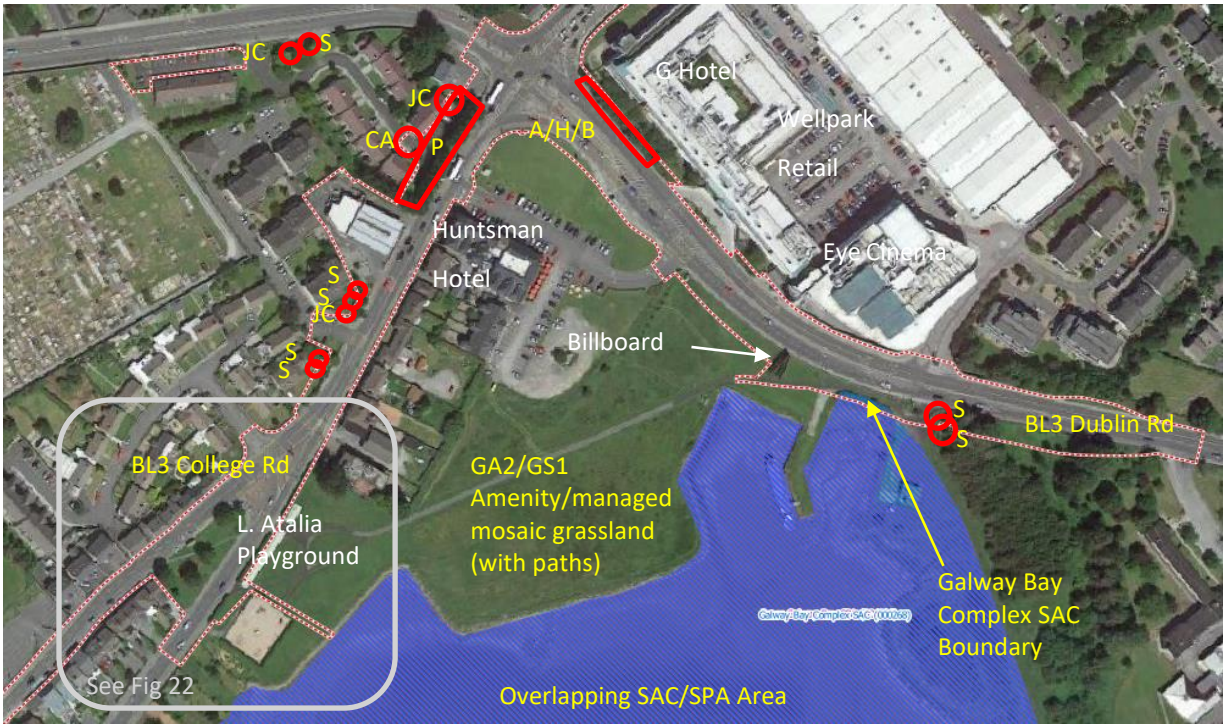

Figure 23. Showing the project boundary in detail and habitats at the Dublin Road and trees marked for removal (S = Sycamore, P = Poplar treeline, A/H/B = Alder/Holly/Birch mix, JC = Japanese cherry, CA = Crab Apple).

The site was surveyed in August 2019 and April 2020 and in September and October 2020, in September 2021 and again in August 2022 by the author and ground truthing shows that there are no Annexed habitats or no qualifying habitats under the footprint of the intersecting areas.

The upper area of intersecting SAC habitat at the inner extent of Lough Atalia adjacent to the Dublin Road comprises bramble scrub with Lilac bushes (*Syringa vulgaris*) and large patches of Winter heliotrope (*Petasites pyrenaicus*) along the roadside boundary wall (see Photo 6 below), under the

billboard (to be removed) and surrounding the Huntsman car park. The indicated SAC boundary area (Figure 22) does not correspond to an Annexed habitat.

Many of the fringing habitats around this section of Lough Atalia have been modified by modern development such as private gardens lining the lough, the Playground area to the west of the Huntsman Inn, and amenity grassland which is managed by Galway City Council. To this end, they are of reduced value to Wintering birds which prefer the intertidal and aquatic habitats of the lagoon itself.

Unmanaged areas recorded in July and August 2019 correspond to rough neutral grassland (GS1) managed for biodiversity. Thus the grassland at this area presents a transitional mosaic of amenity and rough neutral grassland depending on the time of year and management.

Species recorded in site visits in July in unmanaged areas includes abundant False oat grass *(Arrhenatherum elatius)*, Common knapweed *(Centaurea nigra)*, Tufted vetch *(Vicia cracca)*, Red clover *(Trifolium pratense)*, Creeping cinquefoil *(Potentilla reptans)*, Black medick *(Medicago lupulina)*, Ribwort plantain *(Plantago lanceolata)*, Broad dock *(Rumex obtusifolius)*, Thistles *(Cirsium arvense & C. vulgare)*, Common sorrel *(Rumex acetosa)* with Meadowsweet *(Ulmaria filipendula)*, Hard rush *(Juncus inflexus)* in wetter patches along with abundant Great willowherb *(Epilobium hirsutum)*. Silverweed *(Potentilla anserina)* was common in the areas closer to the Huntsman along with frequent Red Bartsia *(Odontites verna)*.

These areas were mown by the time the site visit was undertaken in April 2020 and again in Autumn 2020. Additionally, some repairs had been made to the boundary wall in the vicinity of the proposed path side works outside the SAC area, see Photo 6.

Photo 6. Showing the approach to Moneenageisha junction on the Dublin Road. Note the disturbed ground and wall repairs.

Galway Harbour Enterprise Park

It is proposed to use two sections of the Galway Harbour Enterprise Park as a site compounds see Figure 23 and Photo 7 below. The areas comprise existing rough ground compound with Recolonising bare ground (ED3) being the predominant habitat. Species present include typical ruderals such as Nipplewort *(Lapsana communis)*, Dandelion *(Taraxacum agg.)*, Ragwort *(Senecio jacobaea)*, Bucks-horn plantain *(Plantago coronopus)* and Daisy *(Bellis perennis)*. Sea radish *(Raphanus raphanistrum ssp.maritimus)* is also common throughout the area with Broad dock *(Rumex obtusifolius)*, Coltsfoot *(Tussilago farfara)*, Nettle *(Urtica diocia)* and Red valerian *(Centranthus ruber)*. Two plants of Japanese Knotweed *(Reynoutria japonica)*(JKW) are located c. 32m from the site boundary in this area (ITM 530713 725014).

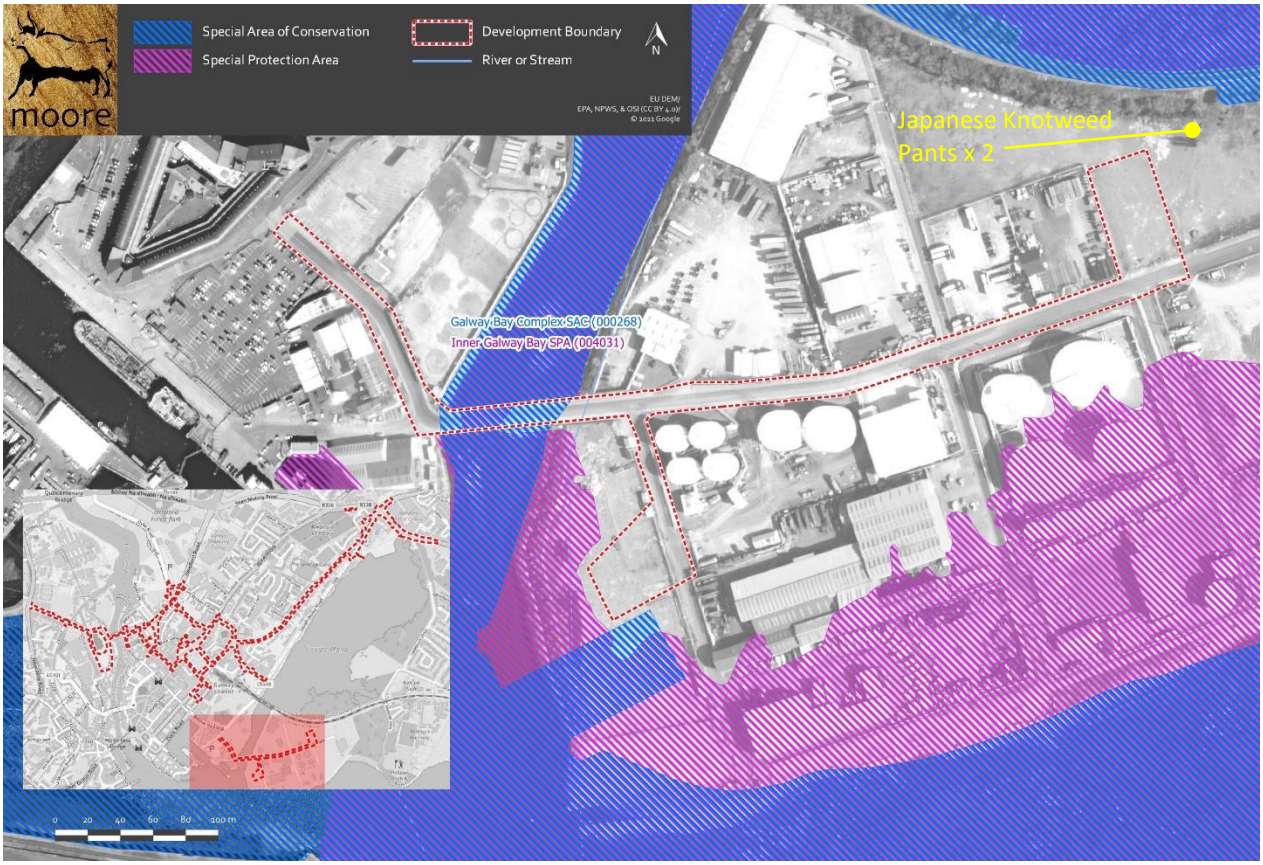

Figure 24. Showing the project boundary in the Galway Harbour Enterprise Park area.

3.2.2. Invasive Species

There are no records of Third Schedule[5] invasive species within in the Project redline boundary.

One record of two relatively small bushes of Japanese Knotweed were recorded during habitat surveys located c.32m to the east of a proposed site compound at Galway Harbour Enterprise Park, see Photo 7 below.

There are two known records of Japanese Knotweed currently undergoing treatment by GCC in close proximity to the Proposed Scheme.

A record at Beggars Bridge, University Road, on the south side adjacent to the Millennium Children's Park appears to have been successfully treated with no signs of regrowth in March 2022.

A record at Lough Atalia Playground, adjacent to the bike park appears to have been successfully treated with no signs of regrowth in March 2022.

[5] The European Communities (Birds and Natural Habitats) Regulations 2011 contain provisions to address the problem of invasive species. These are listed in the Third Schedule of the Regulations.

Photo 7. Showing two Japanese Knotweed plants in the Galway Harbour Enterprise Park.

3.2.3. Fauna

Otters

Otters are well known to occur in the River Corrib both upstream of the Salmon Weir, in the Eglinton Canal and in the lower estuarine section of the river along Nimmo's Pier and signs have been record in Lough Atalia.

There is low potential for otter holts in the mill races or main river channel in the survey area given the solid bedrock and artificial surfaces historically placed as foundation for the main river channel and adjacent mill races. The rock armour of sections of Lough Atalia provides more opportunities in this respect.

Otters have been recorded upstream of the Salmon Weir and this author observed one swimming in the upper river c.500m upstream of the weir to the rear of the NUIG campus in November 2015. There is an undocumented record from February 2020 by Dr. P. Gargan, IFI (pers. comm.) from the area below the Salmon Weir.

There are several sightings of otter on the NBDC website from 2015 – 2016 in the upper river and along the Eglinton Canal, which is directly connected to the upper river, and at the Claddagh Quay, see Diagram 12.10 below.

The closest records are of sightings of live animals with records from the Eglinton Canal in the vicinity of the Ryan Institute at NUIG from April and June 2016, from the splitting point from the Eglinton Canal of St. Clare's River at Canal Road Upper from 2013, 2014 and 2016, and one record from the location of the 'Bish Weir' downstream on St. Clare's River from 2016.

There are also records from the Eglinton Canal where it meets the Claddagh Basin and also from the estuarine section of the river around Nimmo's Pier and Claddagh Beach and in Lough Atalia.

Anecdotal information suggests that there is a possible holt or resting place at the base of the Atlantic Apartment Building adjacent to the Fisheries Tower near Wolf Tone Bridge (pers. comm. Ross Macklin having surveyed the city waterways for otters). However, this was not evident during the survey of this area during cleaning works in October 2020 when the water level was dropped.

It is clear from the records that otters are commuting from the lower River near the Claddagh Basin along the mill races at Parkavara and Nuns Island to the Eglinton Canal and the upper River Corrib. This was confirmed during a walk by the author on 3 April 2022 when a single otter was observed swimming in the lower reaches of St. Clare's River at Mill Street opposite the Garda Station. The otter continued under the road leaving Nun's Island and was observed disappearing into the sluice under the Bridge Mills Building. A notable record given it was mid-afternoon in bright daylight.

It is likely that the salmon weir and side weirs are limiting factors in terms of movement on the main river channel in this regard.

Records of otters from the NBDC database downloaded on 2 March 2022 are presented in Figure 24 below.

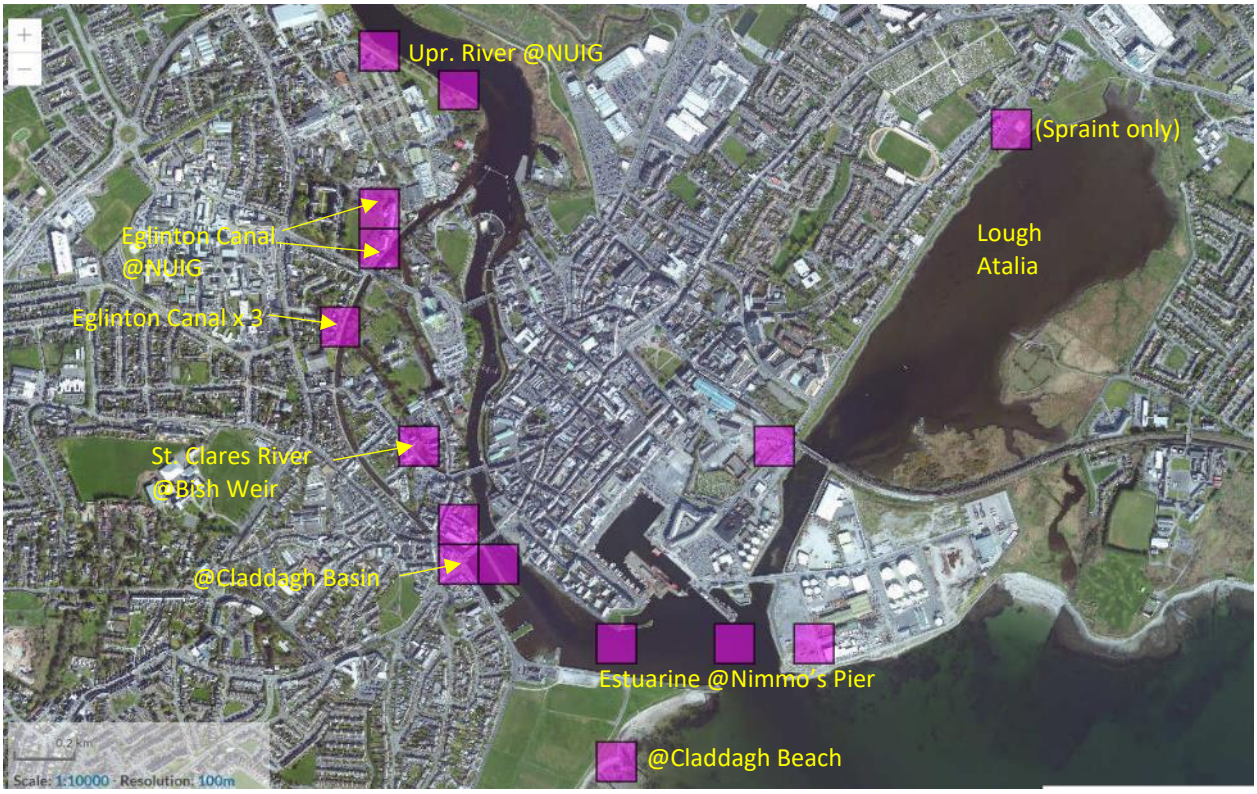

Figure 25. Showing the NBDC records for otters in the study area (02/03/22).

Bats

Tree Surveys

All trees within the project boundary were assessed for bat roost potential – there were no trees of the appropriate size and with sufficient gaps, cracks, crevices or holes to be used by bats.

The results of bat surveys for the N6 Outer Ring Road Project (PL.07 302848 & PL.07 302885), have shown that this species does not occur in the subject project development areas and will not be affected. This is supported by the results of radio tracking surveys for the of the N6 Project which have shown that this species did not forage in the urban area of Galway City to the south of the Quincentenary Bridge (Rush, T., Billington, G., 2015 loc.cit).

Seals

Harbour/Common seal (*Phoca vitulina*) are regularly seen in the estuarine waters downstream of Wolf Tone Bridge in the estuarine environment of the river between the Claddagh Basin and the Spanish Parade embankment.

Salmonids

The Galway Fishery starts from just below the weir and extends the short distance of 250 metres down to the Salmon Weir Bridge. It's one of the most prolific salmon fisheries in Ireland as the fish queue up to navigate the weir.

The River Corrib is registered as a Salmonid Water under the Salmonid Regulations (S.I. 293 / 1988). Salmonid waters are included within the Register as areas protected for water dependent species and habitats. The protected areas for Salmonid species are comprised of the 34 Salmonid rivers, tributaries and lakes listed in the Salmonid Regulations (S.I. 293 / 1988).

Persse's Distillery River is of low value to fish. The water course is impeded by a small weir at the confluence with the main river channel and upstream there is a higher weir and sluice at the confluence of the Eglinton Canal. The low fisheries value of this water course was confirmed in a meeting with the IFI. Friar's Distillery River is of some value to trout and coarse fish with movements being predominantly from the upstream area of Waterside and the upper river.

Lamprey

The River Corrib is noted as an important river for Sea Lamprey (*Petromyzon marinus*)(Igoe *et al.*, 2004[6]) whereas no River Lamprey have been recorded from the Corrib system. The Project Ecologist has observed cormorants feeding on sea lamprey both on the riverbank at the Fisheries Tower and from the river downstream of Wole Tone Bridge.

During a qualitative survey of lampreys present in the Corrib catchment, only one species of lamprey was confirmed from the Corrib catchment: Brook lamprey (*Lampetra planeri*)[7]. Sea lampreys are present in the catchment but seem to be confined to below the Galway Regulating Weir. Although there are records of sea lampreys in some of the tributaries of Lough Corrib, these records pre-date the construction of the existing weir. The success of sea lamprey spawning below the regulating weir in Galway is unknown.

Birds

In addition to summer breeding birds recorded in the project EIAR, the presence of Common tern (*Sterna hirundo*), a Qualifying Interest of the Inner Galway Bay SPA, is notable as is the presence of a nesting raft placed in 2019 at the western end of in Lough Atalia opposite the Galmont Hotel. The raft is monitored by Conservation Volunteers Galway and has recorded regular breeding pairs since then. The nearest raft is located c. 570m from the work area at Lough Atalia Playground.

Wintering birds

[6] Igoe, Fran & Quigley, Declan & Marnell, Ferdia & Meskell, E. & O'Connor, W. & Byrne, C. (2004). The Sea Lamprey Petromyzon marinus (L.), River Lamprey Lampetra fluviatilis (L.) and Brook Lamprey Lampetra planeri (Bloch) in Ireland: General Biology, Ecology, Distribution and Status with Recommendations for Conservation. Biology and Environment-proceedings of The Royal Irish Academy.

[7] O'Connor, W. (2007) A Survey of Juvenile Lamprey Populations in the Corrib and Suir Catchments. Irish Wildlife Manuals No. 26. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Inner Galway Bay is a key site supporting numbers of waterbirds of international and national importance. Based on counts between 2013/14 and 2017/18[8], the mean peak annual count is 13,294 and includes the following species; Great Northern Diver, Light-bellied Brent Goose, Bar-tailed Godwit, Black-tailed Godwit, Cormorant, Curlew, Dunlin, Little Egret, Great Crested Grebe, Greenshank, Golden Plover, Grey Plover, Grey Heron, Lapwing, Little Grebe, Redshank, Red-breasted Merganser, Ringed Plover, Shelduck, Shoveler, Teal, Turnstone and Wigeon.

Birdwatch Galway note that during Winter Little Grebe and duck like Wigeon, Teal, Shelduck, Goldeneye and Red-breasted Merganser can be seen at close range. Of special note is the winter Scaup flock, which may number 50 birds[9].

The footprint area of a proposed outfall to Lough Atalia at Lough Atalia Playground was deemed suitable for wintering birds and surveyed in November 2021, January 2022 and March 2022.

The approach for wintering bird surveys was a 'look-see' methodology (based on Gilbert et al. 1998)[10]. All birds present within a site were identified with reference to the Collins Bird Guide (Svensson *et al.*, 2021)[11] to confirm identification (where necessary). The estimated flock size of birds present, their general location within the site and any activity exhibited were also recorded.

Wintering bird species recorded at low tide at Lough Atalia in the vicinity of the proposed outfall at Lough Atalia Playground includes Mute swan (*Cygnus olor*)(12) and Wigeon (*Anas penelope*)(12) in January 2022, flocks of Black-headed gulls (*Chroicocephalus ridibundus*) +70 on 2 March 2022, small numbers of Teal (*Anas crecca*)(8) and Oystercatcher (*Haematopus ostralegus*)(12), Redshank (*Tringa totanus*)(4) and occasional single Little Egret (*Egretta garzetta*).

While these surveys do not constitute a full Winter bird survey, they are representative of the birdlife present at the location of the proposed outfall at the shoreline at Lough Atalia Playground. It may also be noted that the bird population in the area are mobile and present in varying numbers depending on the state of the tide with much reduced habitat availability at high water when rocks and mudflats are covered.

Additionally, repeated fieldwork particularly in the vicinity of the eastern extent of Lough Atalia and specifically in relation to the areas of amenity grassland, has determined that these areas are of reduced value to Wintering birds due to the existing levels of human activity and preference for the intertidal and aquatic habitats of the lagoon itself.

[8] Fitzgerald, N., Burke, B. & Lewis, L.J. (2021) Irish Wetland Bird Survey: Results of waterbird monitoring in Ireland in 2016/17 and 2017/18. BirdWatch Ireland, Wicklow.
[9] http://www.birdwatchgalway.org/whereto1.htm#atalia
[10] Gilbert, G., Gibbons, D. W. & Evans, J. (1998). Bird Monitoring Methods. RSPB, Sandy.
[11] Svensson, L., Mullarney, K. and D. Zetterstrom (2021) Collins Bird Guide, App edition.

3.3. Conservation Objectives of European Sites

The Qualifying interests and Special Conservation Interests of the European sites considered in the assessment have been addressed in Table 2 in the Screening Stage herein and the majority of qualifying habitats and species of conservation concern have been screened out with the exception of those habitats and species associated with the receiving aquatic environment in the River Corrib and Galway Bay, specifically at Lough Atalia. As such only those remaining species are considered in further detail in the following sections.

3.3.1. Galway Bay Complex SAC [000268]

Specific Conservation Objectives and Target Notes are set by the NPWS (Version 1. 16th April 2013) for the Galway Bay Complex SAC (000268) for Coastal Lagoons, Otters and Common Seals are as follows:

1150 Coastal lagoons

To restore the favourable conservation condition of Coastal lagoons in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable, subject to slight natural variation. Favourable reference area 76.7ha. See map 4	Areas calculated from spatial data derived from Oliver, 2007. Site codes IL037, IL038, IL039, IL046, IL047, IL048, IL049, IL050, IL051, IL052. NB there may be more, as yet unmapped, lagoons within this SAC. See lagoon supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 4 for mapped lagoons	Sites IL037, IL038, IL039, IL046, IL047, IL048, IL049, IL050, IL051, IL052 in Oliver, 2007. NB there may be more, as yet unmapped, lagoons within this SAC. See lagoon supporting document for further details
Salinity regime	Practical salinity units (psu)	Median annual salinity and temporal variation within natural ranges	The lagoons in the site vary from oligohaline to euhaline. See lagoon supporting document for further details
Hydrological regime	Metres	Annual water level fluctuations and minima within natural ranges	Most of the lagoons listed for this site are considered to be shallow; however, Aughinish lagoon and Lough Atalia do have deeper (at least 3m) parts. See lagoon supporting document for further details
Barrier: connectivity between lagoon and sea	Permeability	Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management	The lagoons within this site exhibit a variety of barrier types including cobble/shingle, karst and artificial embankment/causeway. Several are recorded as having sluices. See lagoon supporting document for further details
Water quality: Chlorophyll *a*	µg/L	Annual median chlorophyll *a* within natural ranges and less than 5µg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Water quality: Molybdate Reactive Phosphorus (MRP)	mg/L	Annual median MRP within natural ranges 0.1mg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Water quality: Dissolved Inorganic Nitrogen (DIN)	mg/L	Annual median DIN within natural ranges and less than 0.15mg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Depth of macrophyte colonisation	Metres	Macrophyte colonisation to at least 2m depth	For shallow lagoons, it is expected that macrophytes should extend to their deepest points. See lagoon supporting document for further details
Typical plant species	Number and m^2	Maintain number and extent of listed lagoonal specialists, subject to natural variation	Species listed in Oliver, 2007. See lagoon supporting document for further details
Typical animal species	Number	Maintain listed lagoon specialists, subject to natural variation	Species listed in Oliver, 2007. See lagoon supporting document for further details
Negative indicator species	Number and % cover	Negative indicator species absent or under control	Low salinity, shallow water and elevated nutrient levels increase the threat of accelerated encroachment by reedbeds. See lagoon supporting document for further details

1355 Otter *Lutra lutra*

To restore the favourable conservation condition of Otter in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range in the west is estimated at 70% (Bailey and Rochford, 2006).
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 262ha above high water mark (HWM); 14ha along river banks/around ponds	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 2040ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (NPWS, 2007; Kruuk, 2006)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 4km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 21ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk, 2006; Kruuk and Moorhouse, 1991)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006) and wrasse and rockling in coastal waters (Kingston et al., 1999)
Barriers to connectivity	Number	No significant increase. For guidance, see map 11	Otters will regularly commute across stretches of open water up to 500m e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

1365 Harbour seal *Phoca vitulina*

To maintain the favourable conservation condition of Harbour Seal in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use. See map 12	See marine supporting document for further details
Breeding behaviour	Breeding sites	Conserve breeding sites in a natural condition. See map 12	Attribute and target based on background knowledge of Irish breeding populations, review of data summarised by Summers et al. (1980), Warner (1983), Harrington (1990), Doyle (2002), Lyons (2004), and unpublished NPWS records. See marine supporting document for further details
Moulting behaviour	Moult haul-out sites	Conserve moult haul-out sites in a natural condition. See map 12	Attribute and target based on background knowledge of Irish populations, review of data from Doyle (2002), Lyons (2004), Cronin et al. (2004), NPWS (2010, 2011, 2012) and unpublished NPWS records. See marine supporting document for further details
Resting behaviour	Resting haul-out sites	Conserve resting haul-out sites in a natural condition. See map 12	Attribute and target based on background knowledge of Irish populations, review of data from Doyle (2002), Lyons (2004) and unpublished NPWS records. See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the harbour seal population at the site	See marine supporting document for further details

3.3.2. Lough Corrib SAC [000297]

Specific Conservation Objectives and Target Notes are set by the NPWS (Version 1. 28th April 2017) for the Lough Corrib SAC (000297) for Sea lamprey, Salmon and Otter and are as follows:

1095 Sea Lamprey *Petromyzon marinus*

To restore the favourable conservation condition of Sea Lamprey in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	Sea lamprey (*Petromyzon marinus*) traditionally congregate and build spawning nests in the River Corrib in Galway city, both up- and downstream of the Salmon Weir Bridge. Their further upstream passage is impeded by the regulating weir immediately upstream. The combination of barriers to passage and low flows can impede further upstream passage in Irish catchments and prevent or reduce penetration and extensive colonisation (Gargan et al., 2011; Rooney et al., 2015). Sea lamprey have been recorded passing through the denil fish passage facility at the regulating weir. However, no quantitative assessment has been made, nor has any annual record been maintained. Sea lamprey have also been observed using their sucker mouths to project themselves up the damp concrete faces of the weir structure at low water levels (J. King, Inland Fisheries Ireland (IFI), pers. comm.)
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on Harvey and Cowx (2003) and O'Connor (2007)
Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density at least 1/m²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on Harvey and Cowx (2003). No sites surveyed in 2006 (O'Connor, 2007) or 2013 (IFI, unpublished data) were positive for sea lamprey ammocoetes
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed habitat mapping by Inland Fisheries Ireland (IFI). Lampreys spawn in clean gravels. Artificial barriers can prevent lampreys from accessing suitable spawning habitat. As mentioned above, artificial barriers are currently preventing lamprey from accessing suitable spawning habitat above the regulating weir in the River Corrib
Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive, with a minimum of four positive sites in a catchment, which are at least 5km apart	Artificial barriers can prevent juvenile lampreys from accessing the full extent of suitable habitat. Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King et al., 2015). However, it is vital that such sedimenting habitats are retained

1106 Salmon *Salmo salar*

To maintain the favourable conservation condition of Atlantic Salmon in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	100% of river channels down to second order accessible from estuary	There are no barriers to migration of salmon (*Salmo salar*) in Lough Corrib SAC. Salmon spawn in the headwaters of Lough Corrib tributaries. There is an artificial canal joining Lough Corrib and Lough Mask where salmon did not have access historically and does not constistute a limit on the distribution of salmon in Lough Corrib SAC
Adult spawning fish	Number	Conservation limit (CL) for each system consistently exceeded	A conservation limit (CL) is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee on Salmon (SSCS) annual model output of CL attainment levels. See SSCS (2016). Attainment of CL estimates are derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The Corrib catchment is currently exceeding its CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling	The target is the threshold value for rivers currently exceeding their conservation limit (CL)
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (*Lepeophtheirus salmonis*)
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	Salmon spawn in clean gravels. The habitat for salmon is good and habitat rehabilitation programmes have been undertaken throughout the Corrib catchment to restore drained channels and repair habitat damaged by overgrazing
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)

1355	Otter *Lutra lutra*		
To maintain the favourable conservation condition of Otter in Lough Corrib SAC, which is defined by the following list of attributes and targets:			
Attribute	**Measure**	**Target**	**Notes**
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. Favourable Conservation Status (FCS) target, based on 1980/81 survey findings, is 88% in SACs. Current range is estimated at 93.6% (Reid et al., 2013)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 1,054ha along river banks/ lake shoreline/around ponds	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline and river banks identified as critical for otters (NPWS, 2007)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 314.2km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake) habitat	Hectares	No significant decline. Area mapped and calculated as 4,178ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk and Moorhouse, 1991; Kruuk, 2006)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006; Reid et al., 2013)
Barriers to connectivity	Number	No significant increase. For guidance, see map 12	Otters will regularly commute across stretches of open water up to 500m e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

3.3.3. Inner Galway Bay SPA [004031]

Generic Conservation Objectives are set by the NPWS (Version 1. 1 May 2013) for the Inner Galway Bay SPA (004131) as follows:

To maintain the favourable conservation condition of the [bird species listed] as Special Conservation Interests for the Inner Galway Bay SPA, which is defined by the following targets:

> **Population trend; Percentage change** - Long term population trend stable or increasing.
>
> **Distribution; Range, timing and intensity of use of areas** - No significant decrease in the range, timing or intensity of use of areas by great northern diver, other than that occurring from natural patterns of variation.

Specific Conservation Objectives are set out for the following species:

A017 Cormorant Phalacrocorax carbo

To maintain the favourable conservation condition of Cormorant in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

- Breeding population abundance: apparently occupied nests (AONs); Number - No significant decline.
- Productivity rate; Mean number - No significant decline.
- Distribution: breeding colonies; Number; location; area (hectares) - No significant decline.
- Prey biomass available; Kilogrammes - No significant decline.
- Barriers to connectivity; Number; location; shape; area (hectares) - No significant increase.
- Disturbance at breeding site; Level of impact - Human activities should occur at levels that do not adversely affect the breeding cormorant population.
- Population trend; Percentage change - Long term population trend stable or increasing.
- Distribution; Number and range of areas used by waterbirds - No significant decrease in the numbers or range of areas used by cormorant, other than that occurring from natural patterns of variation.

A191 Sandwich Tern *Sterna sandvicensis*

To maintain the favourable conservation condition of Sandwich Tern in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

- Breeding population abundance: apparently occupied nests (AONs); Number - No significant decline.
- Productivity rate; Mean number - No significant decline.
- Distribution: breeding colonies; Number; location; area (hectares) - No significant decline.
- Prey biomass available; Kilogrammes - No significant decline.
- Barriers to connectivity; Number; location; shape; area (hectares) - No significant increase.
- Disturbance at breeding site; Level of impact - Human activities should occur at levels that do not adversely affect the breeding cormorant population.

A193 Common Tern *Sterna hirundo*

To maintain the favourable conservation condition of Common Tern in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

- Breeding population abundance: apparently occupied nests (AONs); Number - No significant decline.
- Productivity rate; Mean number - No significant decline.
- Distribution: breeding colonies; Number; location; area (hectares) - No significant decline.
- Prey biomass available; Kilogrammes - No significant decline.
- Barriers to connectivity; Number; location; shape; area (hectares) - No significant increase.

- Disturbance at breeding site; Level of impact - Human activities should occur at levels that do not adversely affect the breeding cormorant population.

A999 Wetlands

To maintain the favourable conservation condition of wetland habitat in Inner Galway Bay SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Habitat area; Hectares - The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 13,267ha, other than that occurring from natural patterns of variation.

3.4. Consideration of Effects to European Sites

3.4.1. Habitats Directive Annex I Habitats

The Proposed Scheme site is located adjacent to the River Corrib which is designated as part of the Lough Corrib SAC (Site Code 002162). Only the main channel of the lower River Corrib is designated in this area and there are no Annex I habitats located under the footprint or in the vicinity of the adjacent Special Area of Conservation. The main channel of the River Corrib at the Salmon Weir Bridge sampling point returned a Q4 value for the most recent sampling period, 2018, indicating Good water quality status.

A worst-case scenario may arise were the Proposed Scheme results in a significant detrimental change in water quality in the River Corrib either alone or in combination with other projects or plans as a result of pollution. The effect would have to be considered in terms of changes in water quality which would significantly affect the habitats or food sources for which the Lough Corrib or Galway Bay European Sites species are designated.

Habitats at University Road

The predominant habitats at University Road are artificial and include road and paved surfaces. However, the scheme crosses the Eglinton Canal and at Ward's Shop there are openings in the roadside wall to the canal where surface water could potentially enter the canal.

The possibility of this occurring is unlikely but cannot be ruled out and any discharge of contaminated surface water either from an event of sustained elevated suspended solids or a Hydrocarbon spill has the potential to have a negative moderate effect on the immediate receiving environment of the canal. The effect will be temporary and unlikely to reach the main channel of the River Corrib. However, construction management will be employed to avoid the possibility.

Habitats at Salmon Weir Bridge

The predominant habitats at Salmon Weir are artificial and include road and paved surfaces. However, the scheme crosses the main channel of the river which is designated as part of the Lough Corrib SAC. It is unlikely that surface water will enter river as there are no pathways. It is not predicted that significant levels of dust will be generated from the proposed works.

The possibility of elevated suspended solids from dust occurring is unlikely but cannot be ruled out and the contamination of surface water either from an event of sustained elevated suspended solids has the potential to have a negative moderate effect on the immediate receiving environment of the river. The effect will be temporary and not significant. However, construction management will be employed to avoid the possibility.

Habitats at Lough Atalia

At the College Road Service Station (CRSS), the works will include the removal of two underground tanks and the removal of two pumping stations also requiring the removal and relocation of a number of underground fuel pipes within the site along with excavation of up to approximately 200m^3 of contaminated soil and stone. This aspect of the Scheme is considered a Remedial Strategy in terms of the operational stage of the Proposed Scheme.

A new drainage pipe and non-return valve to be installed at discharge point into Lough Atalia. Additionally, a new attenuation tank and petrol interceptor will need to be installed, which will require excavation of approximately 3.5m -3.75m for installation.

The habitats present at Lough Atalia Playground are artificial and include adjacent Amenity grassland (GA2) through which the pipeline to the outfall would be placed. The discharge point is comprised of an artificial rock armour shoreline (CC1) and there are no Annexed habitats under the footprint of the works.

However, uncontrolled surface water could potentially enter the receiving environment of Lough Atalia. The possibility of this occurring is unlikely but cannot be ruled out and any discharge of contaminated surface water either from an event of sustained elevated suspended solids or a Hydrocarbon spill could have a Negative, Moderate effect on the immediate receiving environment of the Lough. The effect on the Annexed priority habitat **'Coastal Lagoons [1150]'** would be temporary and construction management will be required to avoid the possibility.

The proposed works at the Dublin Road proximal to Lough Atalia include upgrading of the footpath at the eastern extent of Lough Atalia opposite the G Hotel/Eye Cinema. The boundary of SAC and SPA is located on the southern side of the local path below the high-water mark and the artificial surfaces of the footpath and road in this area are of low local ecological value.

Uncontrolled surface water could potentially enter the receiving environment of Lough Atalia. The possibility of this occurring is unlikely but cannot be ruled out and any discharge of contaminated surface water either from an event of sustained elevated suspended solids or a Hydrocarbon spill could have a negative moderate effect on the immediate receiving environment of the lough. The effect would be temporary and construction management will be employed to avoid the possibility.

Invasive Species

The record of JKW at Galway Harbour Enterprise Park is located over 32m from the compound boundary and may be noted for avoidance only. It does not require specific management for this Scheme.

3.4.2. Birds Directive Annex I Birds

There will be no direct effects on any Annex I Birds Directive Birds roosting or nesting places and so the main concern is with regard to disturbance effects and indirect effects on water quality. Indirect effects in the form of a pollution event e.g. from a fuel spill could affect mortality or reduce feeding potential will need to be controlled.

The proposed works at the intertidal site of the proposed outfall at Lough Atalia Playground have the potential to disturb wintering birds in these areas. Given, the quieter more secluded location of the proposed outfall, Wintering birds are less likely to be acclimatised to disturbance.

Given the proximity of the adjacent Dublin Road opposite the Eye Cinema and the existing level of urban disturbance on a busy national road and walkers on the Lough Atalia pathways, the predicted effect from disturbance on birds in this section of the SPA is unlikely in an area up to 150m from the works area where birds are accustomed to the existing levels of disturbance.

3.4.3. Habitats Directive Annex II Species

Otter [1355]

There were no signs of otters at Lough Atalia Playground along the shore from the vicinity of the Dublin Road to the site of the proposed outfall. The rock armour is embedded in concrete and does not present opportunities for holt construction. Any previous signs, such as spraints would have been from occasional passing otters which could occur at any time in the future.

There will be no direct effects on otter holts or resting places. It is unlikely that the construction phase would generate significant disturbance to otters and there will be no permanent barriers to otter movement during the construction phase.

Indirect effects in the form of a pollution event e.g. from a fuel spill could affect prey mortality or reduce feeding potential will need to be controlled.

Harbour Seal [1365]

There will be no direct effect on Harbour seals and potential effects are indirectly related to water quality and food sources.

Atlantic Salmon [1106]

There will be no direct effect on salmonids and potential effects are indirectly related to water quality and food sources.

Elevated suspended solids may be harmful to salmonids resulting in reduced oxygenation of surface waters due to settlement and the formation of deposits on the riverbed which in turn can give rise to septic and offensive conditions. Elevated suspended solids can clog salmonid gills and potentially cause mortality.

Chemical spills can result in fish mortality and could affect feeding habitats for bird species that rely on the sand and mudflats downstream in Galway Bay for food sources.

Wet concrete and cement are very alkaline and corrosive and, in the absence of mitigation, can cause serious pollution to watercourses.

Sea Lamprey [1095]

There will be no direct effect on Lamprey species and potential effects are indirectly related to water quality and food sources.

3.4.4. Ecological Network Supporting Natura 2000 Sites

A concurrent analysis of the proposed Natural Heritage Areas and designated Natural Heritage Areas in terms of their role in supporting the species using Natura 2000 sites was undertaken. These supporting roles mainly relate to mobile fauna such as mammals and birds which may use pNHAs and NHAs as ecological corridors or "stepping stones" between Natura 2000 sites.

Article 10 of the Habitats Directive places a high degree of importance on such non-Natura 2000 areas as features that connect the Natura 2000 network. Features such as ponds, woodlands and important hedgerows were taken into account during the project design and preparation of the AA screening report and NIS.

The NHAs and pNHAs identified in Figure 15 are located outside the Zone of Influence, with the exception of those which share the boundaries of the Galway Bay Complex SAC and Inner Galway Bay SPA. Accordingly, the Galway Bay Complex pNHA is considered under its higher conservation status as a European site.

The River Corrib is not designated as a pNHA for the stretch of river from the Quincentenary Bridge to Wolfe Tone Bridge to the north and south of the Proposed Scheme respectively. However, it is included in the Lough Corrib SAC

3.5. Effects on the Qualifying Interests of European Sites

3.5.1. Direct Effects

The only areas where the Proposed Scheme intersects directly with a European site boundary are at the Salmon Weir Bridge, at site of the proposed outfall at Lough Atalia playground and at the inner extent of Lough Atalia at the Dublin Road.

Salmon Weir Bridge

The predominant habitats at Salmon Weir are artificial and include road and paved surfaces. However, the scheme crosses the main channel of the river which is designated as part of the Lough Corrib SAC. It is unlikely that surface water will enter river as there are no pathways. It is not predicted that significant levels of dust will be generated from the proposed works.

The possibility of elevated suspended solids from dust occurring is unlikely but cannot be ruled out and the contamination of surface water either from an event of sustained elevated suspended solids has the potential to have a negative moderate effect on the immediate receiving environment of the river. The effect will be temporary and not significant and relates to the presence of Salmon in the river below and Otters and Sea Lamprey in the downstream section of the river.

Lough Atalia

The habitats present at Lough Atalia Playground are artificial and include adjacent Amenity grassland (GA2) through which the pipeline to the outfall would be placed. The discharge point is comprised of an artificial rock armour shoreline (CC1) and works are restricted to the upper level of the rock armour, thus, there are no predicted effects on the intertidal habitats in the vicinity of the proposed works.

The proposed works at the Dublin Road proximal to Lough Atalia include upgrading of the footpath at the eastern extent of Lough Atalia opposite the G Hotel/Eye Cinema. The boundary of SAC and SPA are located on the southern side of the local path below the high-water mark and the artificial surfaces of the footpath and road in this area are of low local ecological value.

The primary consideration in terms of source-vector-pathways for direct effects relating to surface water runoff and potential indirect effects on hydrologically linked habitats and aquatic species.

3.5.2. Indirect Effects

The potential for adverse effects is considered whereby the Proposed Scheme would result in a significant detrimental change in water quality either alone or in combination with other projects or plans as a result of indirect pollution of surface water. The effect would have to be considered in terms of changes in water quality which would affect the habitats or species for which the Galway Bay Complex SAC, the Lough Corrib SAC or the Inner Galway Bay SPA are designated.

Consideration of effects on Surface Water

The Scheme crosses the Eglinton Canal and at Ward's Shop there are openings in the roadside wall to the canal where surface water could potentially enter the canal. The possibility of this occurring is unlikely but cannot be ruled out and any discharge of contaminated surface water either from an event of sustained elevated suspended solids or a Hydrocarbon spill has the potential to have a negative moderate effect on the immediate receiving environment of the canal. The effect will be temporary and unlikely to reach the main channel of the River Corrib.

Uncontrolled surface water could potentially enter the receiving environment of Lough Atalia. The possibility of this occurring is unlikely but cannot be ruled out and any discharge of contaminated surface water either from an event of sustained elevated suspended solids or a Hydrocarbon spill could have a negative moderate effect on the immediate receiving environment of the lough. The effect would be temporary and construction management will be required to avoid the possibility.

Any deterioration of water quality from the established Good quality status of the River Corrib and Unpolluted status of Lough Atalia could potentially have a negative indeterminable temporary effect on either the food sources in the aquatic habitats or on aquatic species.

A worst-case scenario may be considered where a pollution event would indirectly affect otters of food availability to otters.

In the absence of mitigation potential indirect negative effects on Harbour seals could be indeterminable but would be unlikely and temporary.

In the absence of mitigation potential indirect negative effects on Salmon could be moderate but would be unlikely and temporary.

In the absence of mitigation potential indirect negative effects on Sea lamprey could be indeterminable but would be unlikely and temporary.

Accidental spillages and contaminated runoff will be avoided by construction management measures which are set out in a Construction Environmental Management Plan (CEMP) which is attached as

Appendix 1 to this report. Management measures include appropriate site-specific measures from the CIRIA Report C532 Control of Water Pollution from Construction Sites.

Consideration of effects on Annexed Birds

There will be no direct effects on birds of conservation concern and so indirect effects in the form of a pollution event e.g. from a fuel spill could affect mortality or reduce feeding potential will need to be controlled as per the consideration of effects on water quality above.

The proposed works at the intertidal site of the proposed outfall at Lough Atalia Playground have the potential to disturb wintering birds in these areas. Given, the quieter more secluded location of the proposed outfall, Wintering birds are less likely to be acclimatised to disturbance. The potential effect in the absence of mitigation would be negative, moderate and temporary and can be avoided by undertaking the works at Lough Atalia Playground outside the Winter bird period October to March (see Mitigation Measures at 3.6 below).

Given the proximity of the adjacent Dublin Road opposite the Eye Cinema and the existing level of urban disturbance on a busy national road and walkers on the Lough Atalia pathways, the predicted effect from disturbance on birds in this section of the SPA is unlikely in an area up to 150m from the works area where birds are accustomed to the existing levels of disturbance and the effect will be imperceptible and temporary and will not require timing restriction.

Nesting terns in Galway Bay are highly unlikely to be affected by the Proposed Scheme given the distance of the proposed works from the nearest raft at Fairgreen Road c.320m and over 500m to the proposed outfall works at Lough Atalia.

3.6. Mitigation Measures

A Construction Environmental Management Plan (CEMP) presented as **Appendix 1** and as part of the planning documentation includes reference to this AA and NIS for the Proposed Scheme, which establishes the potential connectivity of the Proposed Scheme to the Galway Bay Complex SAC, the Lough Corrib SAC and the Inner Galway Bay SPA, and the requirement for avoidance of adverse effects from construction activity.

The Contractor will be required to enforce the CEMP which will include the following construction management measures.

3.6.1. Site Environmental Training and Awareness Procedure

An Ecological Clerk of Works (EcOW) will be employed to maintain a watching brief on the proposed mitigation measures included for the protection of European sites.

An initial site environmental induction and ongoing training will be provided to communicate the main provisions of this environmental plan to all site personnel.

Two-way communication will be encouraged to promote a culture of environmental protection.

The following outlines the information which must be communicated to site staff:

- Environmental procedures of the CEMP.
- Environmental buffers and exclusion zones.
- Housekeeping of materials and waste storage areas.
- Environmental emergency response plan.

Prior to any works, all personnel will receive an on-site induction relating to operations adjacent to watercourses and the environmentally sensitive nature of the River Corrib and to re-emphasise the precautions that are required as well as the construction management measures to be implemented.

Galway City Council will also ensure that the engineer setting out the works is fully aware of the ecological constraints and construction management requirements.

3.6.2. Environmental Emergency Response Plan

In the event of an environmental emergency, all personnel will react quickly and adhere to the Environmental Emergency Response Plan procedure (to be updated by the Contractor). The following outlines the information on the types of emergency which must be communicated to site staff:

- Release of hazardous substance – fuel or oil spill.
- Concrete spill or release of concrete.
- Flood event – extreme rainfall or rising river level event.
- Environmental buffers and exclusion zones breach.
- Housekeeping of materials and waste storage areas breach.
- Stop work orders due to environmental issue or concern (e.g. threat to ecological feature).

3.6.3. Invasive Species Management Plan

Refer to the CEMP (Appendix 5.1 of Volume 4 this EIAR) for full details on the management of the potential for invasive species.

3.6.4. Site Specific Measures

River Corrib at Salmon Weir Bridge

- As a precaution, the control of dust emissions will be enforced by providing a suitable barrier to prevent dust entering the River Corrib at the Salmon Weir Bridge for the length of the Scheme required to prevent emissions to Persse's Distillery river, the main channel of the river and Friar's River at Newtownsmith from the proposed disturbance area. The barrier will be inspected on a weekly basis for gaps or displacement and reinstated when required.
- A record of inspection and efficacy of the barrier will be noted in the printed version of the CEMP as an inspection sheet. The record of inspections will be maintained on site and will be available upon request by relevant authorities.
- Details of the dust minimisation measures are included in a Construction and Demolition Resource and Waste Management Plan, as described in the CEMP (**Appendix 1**).

Eglinton Canal at University Road/Ward's Shop

- The control of surface water discharge will be enforced by providing a suitable barrier to prevent surface water entering the Eglinton Canal at gaps in the boundary wall leading to the canal and for the length of canal required to prevent drainage to the canal from the proposed disturbance area. The barrier will comprise a silt curtain placed with sand bags or a suitable supporting frame. The silt curtain will be inspected on a weekly basis for gaps or displacement and reinstated when required.
- A record of inspection and efficacy of the barrier will be noted in the printed version of the CEMP as an inspection sheet. The record of inspections will be maintained on site and will be available upon request by relevant authorities.

Lough Atalia Playground Outfall

- The works at Lough Atalia Playground will avoid potential disturbance to wintering birds by undertaking the works outside the Winter bird period October to March.
- The works at Lough Atalia Playground will be timed to avoid 'spring' high water times and inclement weather (southerly/south-westerly winds) in order to avoid washing of surface water to the sea. Tide times are available from several websites. The delay time for the ebb and flow time to Lough Atalia will be determined by the Contractor or representative Resident Engineer.
- The control of surface water discharge will be enforced by firstly providing a temporary sandbag dam at the headwall of the proposed outfall prior to work commencing in this area at low tide. The temporary dam will comprise 1 tonne bags (or similar suitable size) placed at low tide at the foot of the rock armour berm in this area. A silt curtain or suitable geotextile

barrier will be placed inside the dam and secured using smaller sandbags as required to form an impermeable barrier to prevent hydrocarbon and contaminated surface water runoff to Lough Atalia.

- The control of surface water discharge will be enforced by providing a suitable barrier to prevent surface water entering Lough Atalia in the proposed trench leading to the outfall. The barrier will comprise a silt fence placed with sand bags or a suitable supporting frame. A typical silt fence consists of a piece of synthetic filter fabric (also called a geotextile) stretched between a series of wooden or metal fence stakes along a horizontal contour level, see Diagram 12.12 below for sample details. The stakes will be installed on the downhill side of the fence, and the bottom edge of the fabric will be trenched into the soil and backfilled on the uphill side. The fence will be installed on a site before soil disturbance begins and is placed down-slope from the disturbance area. The design/placement of the silt fence will create a pooling of runoff, which then allows sedimentation to occur. The silt fence fabric becomes "blocked off" with fine soil particles and clean water can seep through the fabric. The silt fence will be inspected on a weekly basis for gaps or displacement and reinstated when required.
- A record of inspection and efficacy will be noted in the printed version of the CEMP as an inspection sheet. The record of inspections will be maintained on site and will be available upon request by relevant authorities.

Lough Atalia adjacent to the Dublin Road

- The works at the Lough Atalia Dublin Road area will be timed to avoid 'spring' high water times and inclement weather (southerly/south-westerly winds) in order to avoid washing of surface water to the sea. Tide times are available from several websites. The delay time for the ebb and flow time to Lough Atalia will be determined by the Contractor or representative Resident Engineer.
- The control of surface water discharge will be enforced by providing a suitable barrier to prevent surface water entering Lough Atalia. The barrier will comprise a silt fence placed with sand bags or a suitable supporting frame such as a staked fence. A typical silt fence consists of a piece of synthetic filter fabric (also called a geotextile) stretched between a series of wooden or metal fence stakes along a horizontal contour level, see Figure 25 below for sample details. The stakes will be installed on the downhill side of the fence, and the bottom edge of the fabric can be trenched into the soil and backfilled on the uphill side. The fence will be installed on a site before soil disturbance begins and is placed down-slope from the disturbance area. The design/placement of the silt fence should create a pooling of runoff, which then allows sedimentation to occur. The silt fence fabric becomes "blocked off" with fine soil particles and clean water can seep through the fabric.

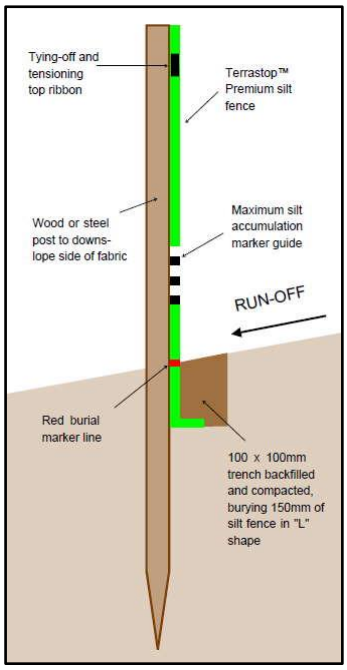

Figure 26. Example of silt fence design.

- The silt fence will be inspected on a weekly basis for gaps or displacement and reinstated when required.
- A record of inspection and efficacy will be noted in the printed version of the CEMP as an inspection sheet. The record of inspections will be maintained on site and will be available upon request by relevant authorities.

3.6.5. Protection of Water Resources

- Tools and equipment will not be cleaned in grassland or aquatic areas.
- Chemicals used will be stored in sealed containers.
- Chemicals shall be applied in such a way as to avoid any spillage or leakage.
- All refuelling, oiling and greasing will take place above drip trays or on an impermeable surface which provides protection to underground strata and away from grassland as far as reasonably practicable. Vehicles will not be left unattended during refuelling.
- All plant will be well maintained with any fuel or oil drips attended to on an ongoing basis.
- Any minor spillage during this process will be cleaned up immediately.
- Best practice in bulk-liquid concrete management addressing pouring and handling, secure shuttering / form-work, adequate curing times will be implemented.
- Wash water from cleaning ready mix concrete lorries and mixers may be contaminated with cement and is therefore highly alkaline, therefore, washing will not be permitted on site.
- Disposal of raw or uncured waste concrete will be controlled to ensure that the aquatic environment will not be impacted.

3.6.6. Management of Excavation and Spoil

For the management of excavation and spoil, the Contractor will:

- Erect all protective fencing.
- Implement the Surface Water Management Plan (including the installation of drainage infrastructure) as detailed in the CEMP **(Appendix 1)** prior to excavation and include areas dedicated to spoil storage with the drainage infrastructure.
- Ensure all spoil and excavated materials will be stored in the construction compounds.
- Ensure stockpiles and adjacent features of drainage infrastructure will be monitored and maintained appropriately.
- The Construction and Demolition Resource and Waste Management Plan, as described in the CEMP (**Appendix 1**) identifies any material such as dust, sand, rubble, concrete that may be generated during demolition works and address its storage and appropriate removal from the site to avoid pathways identified as having connectivity with the River Corrib.

3.6.7. CEMP Guidance & Implementation

The design of construction phase mitigation measures were drawn up using guidelines set out in the following best practice guidance documents:

- Guidelines for the crossing of watercourses during the construction of National Road Schemes. Environmental Series on Construction Impacts. Transport Infrastructure Ireland (TII) (formerly NRA), 2008.
- Environmental Impact Assessment of National Road Schemes – A Practical Guide. Transport Infrastructure Ireland (TII) (formerly NRA) (2008).
- Guidelines for Assessment of Ecological Impacts of National Road Schemes. Transport Infrastructure Ireland (TII) (formerly NRA) (2009).
- Institute of Environmental Assessment. Guidelines for Baseline Ecological Assessment. Chapman & Hall (E & F.N. Spon) (1995).
- Chartered Institute of Ecology and Environmental Management (CIEEM). Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (2019).

- CIRIA Control of water pollution from construction sites. Guidance for consultants and contractors (C532).

The measures proposed have been implemented (and improved) for many years, for a wide range of developments – as evidenced in the guideline documents and experience.

For this reason, it can be considered that the mitigation measures will have a high degree of success.

Site personnel will be trained in the importance of preventing pollution and the mitigation measures described here to ensure same. A record of this training will be maintained by the Contractor.

The Construction Environmental Management Plan will be read and signed by the Contractor/Site Foreman and made available to the EcOW.

The role of monitoring and reporting that will be employed to verify the success of the measures in this particular project will provide additional failsafe confidence in as conditions to proceeding with the Proposed Scheme.

3.7. Assessment of In-Combination Effects

The EU Commission services' interpretation document 'Managing Natura 2000 sites', makes clear that the phrase 'in combination with other plans or projects' in Article 3(3) refers to cumulative effects caused by the projects or plans that are currently under consideration together with the effects of any existing or proposed projects or plans. When impacts are assessed in combination in this way, it can be established whether or not there may be, overall, an impact which may have significant effects on a Natura 2000 site or which may adversely affect the integrity of a site.

As part of the AA, in addition to the proposed works, other relevant projects and plans in the region must also be considered at this stage. This step aims to identify at this early stage any possible significant in-combination or cumulative effects / impacts of the Proposed Scheme with other such plans and projects on European sites.

A review of the National Planning Application Database was undertaken. The first stage of this review confirmed that there were no data gaps in the area where the Proposed Scheme is located . The database was then queried for developments granted planning permission within 50m of the Proposed Scheme within the last three years, these sites where then reviewed for relevant developments in the vicinity of the Proposed Scheme where it is located within the environs of European sites, see Table 3.

In-combination effects were reviewed in terms of;

- Projects completed,
- Projects approved but not started or uncompleted,

- Projects proposed, i.e. for which an application for approval or consent has been made, including refusals subject to appeal and not yet determined,
- Proposals in adopted plans, and
- Proposals in finalised draft plans formally published or submitted for consultation or adoption.

Table 3 Planning applications granted permission in the vicinity of the Proposed Scheme.

Planning Ref.	Description of development	Comments
1912	Permission for a totem sign to replace existing sign pole	No predicted in-combination effects given the nature and scale of the granted development.
19127	Permission for variation to permission ref. no. 14/161 to include demolition of existing conservatory to side of house and for construction of new 2 storey extension, attic conversion, rooflights and the provision of 1 no. on site car space accessed from Canal Road, and all associated site works and services	No predicted in-combination effects given the nature and scale of the granted development.
19254	Planning permission for external alterations. The proposed Project consists of external alterations to the external fabric of the building to incorporate 3 no. widows on the southern elevation of the building as well as all associated works	No predicted in-combination effects given the nature and scale of the granted development.
2095	The application is for the installation of a ground mounted PV solar panel array and associated inverter enclosure in the field to the rear of the Poor Clare's Convent.	No predicted in-combination effects given the nature and scale of the granted development.
20197	The planned expansion of the Galmont Hotel in Galway City Centre. The hotel is located at the junction of Fairgreen and Lough Atalia. The works proposed will be within the existing footprint of the hotel.	No predicted in-combination effects given the nature and scale of the granted development.
20184	The development of land adjacent to the IMC Cinema and Dyke Road Car Park on the Headford Road for a commercial and residential development. The development includes a section of the Headford Road as far as the Dyke Road junction.	An NIS was submitted with this application which included best practice construction management and a determination of no adverse effects on the integrity of any European site there is no potential for in-combination effects.

In-combination effects with these relatively small-scale projects can be ruled out. However, given the requirement for construction management, in combination effects is further assessed.

A review of Foreshore Applications and Determinations available from the Gov.ie Foreshore Licence Application webpage was undertaken and the following Foreshore Licence applications in the Zone of Influence were reviewed:

FS007016 Cable route survey and site investigation, Ballyloughane Strand, Renmore, Co Galway (2020).

Description:

Cable route survey and site investigations for a proposed subsea fibre optic cable

Location:

Ballyloughane Strand, Renmore, Co Galway

An Appropriate Assessment Screening & Natura Impact Statement was presented with this application which determined that '*Based on the assessment of the proposed development (survey) alone and in combination with other projects and plans, including the implementation of mitigation measures, it can be concluded that no adverse effects on the site's integrity will arise, in view of the site's conservation objectives'*.

FS007100 Health Service Executive Deployment of 6 Swim Buoys along Salthill Promenade

Description: To deploy 6 swim buoys along Salthill promenade in support of Healthy Galway City programme which is the structure to implement Healthy Ireland at the local level.

Location: Salthill Promenade, County Galway

An Appropriate Assessment Screening Report was presented with this application which determined that '*The Screening report evaluates the objective information presented in the Project Description, taking consideration of the proposed methodology for deployment and retrieval of the buoys; however, the evaluation does not presuppose that the requirements specified in the design, or to be implemented on site, are integral to avoid or reduce harmful effects on any European Site. Therefore, it is considered that in accordance with Article 6(3) of the Habitats Directive, the proposed deployment of buoys in Galway Bay will not have any significant effects and Stage 2 of the Appropriate Assessment process (Natura Impact Statement) is not required*'.

FS007246 Main lay and construction works for installation of the IRIS sub-sea fibre optic cable system, Co Galway

Description:

Main lay and construction works for the installation of the IRIS sub-sea fibre optic cable system from a landfall in Galway to a landfall in Iceland, providing high speed strategic international telecommunications connectivity from Galway on the west coast of Ireland to the capital city of Iceland, Reykjavik

Location:

Landfall at Ballyloughane Strand, Renmore, Galway, route across Galway Bay, through the South Sound to 12mm limit, southwest of the Aran Islands.

An Appropriate Assessment & Natura Impact Statement was presented with this application which determined that '*given the full and proper implementation of the mitigation prescribed in this NIS dated December 2021, the proposed development, either individually or in combination with other plans or*

projects, will not adversely affect the integrity of Inner Galway Bay SPA, the Galway Bay Complex SAC or any other European Site'.

The Proposed Scheme may give rise to cumulative effects with regard to other planned or proposed projects. Projects in the urban areas of the city are not considered to have potential for in-combination effects and the following projects have been assessed in terms of connectivity to the European sites considered in the assessment.

Four projects have been identified which have the potential to give rise to cumulative effects during the construction and operation phase.

- **GCC (PL. Ref 20/95):** *Permission to install a ground mounted PV solar panel array and associated inverter enclosure.*

  The proposed solar panel project is small in scale, contained in the grounds of the Poor Clares Convent on Nun's Island and there are no predicted impacts on nearby water courses.

  The proposed subject development will have a neutral cumulative effect. The subject project application includes a CEMP which will include the mitigation measures outlined in the NIS and EIAR to avoid significant impacts on biodiversity and the Natura network of sites in the zone of impact. If decommissioning were required, similar measures would be employed.

- **GCC Part 8 Planning:** *Carry out upgrade works to Kirwan's Roundabout*.

  The Kirwan Junction Upgrade project is in construction and includes standard construction management measures with no potential for in-combination effects.

  The proposed subject development will have a neutral cumulative effect. The subject project application includes a CEMP which will include the mitigation measures outlined in the NIS and EIAR to avoid significant impacts on biodiversity and the Natura network of sites in the zone of impact. If decommissioning were required, similar measures would be employed. At the time of writing (July 2022) works had commenced on the site preparation for this project and are likely to be complete before the Proposed Scheme commences.

- **PL.07 302848 & PL.07 302885, N6 Galway City Ring Road:**
  The proposed N6 project application includes a CEMP which will include mitigation measures outlined in the NIS and EIAR to avoid significant impacts on biodiversity and the Natura network of sites in the zone of impact.

  The proposed subject development will have a neutral cumulative effect. The subject project application includes a CEMP which will include the mitigation measures outlined in the NIS and

EIAR to avoid significant impacts on biodiversity and the Natura network of sites in the zone of impact. If decommissioning were required, similar measures would be employed.

- **Salmon Weir Pedestrian Bridge:**

  On the basis of information provided in an Ecological Impact Assessment and NIS for the Salmon Weir Pedestrian Bridge project, also undertaken by Moore Group, it was determined that significant environmental effects are unlikely to arise from the Proposed Scheme in relation to Ecology & Biodiversity.

  The proposed subject development will have a neutral cumulative effect. The subject project application includes a CEMP which will include the mitigation measures outlined in the NIS and EIAR to avoid significant impacts on biodiversity and the Natura network of sites in the zone of impact. If decommissioning were required, similar measures would be employed. At the time of writing (July 2022) works had commenced on the site preparation for the Salmon Weir Pedestrian Bridge project and are likely to be complete before the Proposed Scheme commences.

3.7.1. Conclusion of In-combination Effects

Given the inclusion of strict Best Practice Construction Measures to be included and enforced through the Construction Environmental Management Plan, the Proposed Scheme will have no significant effects on European sites, therefore in-combination effects can be ruled out.

The Galway City Council Development Plan, in complying with the requirements of the Habitats Directive, requires that all Projects and Plans that could affect the Natura 2000 sites in the same zone of influence of the Proposed Scheme site would be initially screened for AA and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative effects. In this way any, in-combination impacts with Plans or Projects for the development area in which the development site is located, would be avoided.

Any new applications for the Proposed Scheme area will be assessed on a case by case basis *initially* by Galway City Council which will determine the requirement for AA as per the requirements of Article 6(3) of the Habitats Directive.

4. Natura Impact Statement & Conclusion

This NIS has reviewed the predicted effects arising from the Proposed Scheme and found that with the implementation of appropriate mitigation measures specifically with regard to surface water, significant effects on the Lough Corrib or Galway Bay European Sites can be ruled out.

It is the conclusion of this NIS, on the basis of the best scientific knowledge available, and subject to the implementation of the mitigation measures set out under Section 3.6, that the possibility of any adverse effects on the integrity of the European Sites considered in this NIS, or on the integrity of any other European Site (having regard to their conservation objectives), arising from the Proposed Scheme, either alone or in combination with other plans or projects, can be excluded beyond a reasonable scientific doubt.

A final determination will be made by the competent authority in this regard.

5. References

Department of the Environment, Heritage and Local Government (2009) Guidance on Appropriate Assessment of plans and projects in Ireland (as amended February 2010).

European Commission (2018) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Brussels 28.9.21.

European Commission (2021) Guidance document on the strict protection of animal species of Community interest under the Habitats Directive, Brussels 12.10.21.

NPWS (2013) Conservation Objectives: Galway Bay Complex SAC 000268. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013) Conservation Objectives: Inner Galway Bay SPA 004031. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2017) Conservation Objectives: Lough Corrib SAC 000297. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2022) National Parks and Wildlife Service Metadata available online at https://www.npws.ie/maps-and-data

Office-of-the-Planning-Regulator (2021) Appropriate Assessment Screening for Development Management OPR Practice Note PN01. March 2021

Appendix 1- Construction Environmental Management Plan

Appendix 1

Construction and Environmental Management Plan

Contents

1 Construction Environmental Management Plan

1.1 Introduction

This document is the Construction Environmental Management Plan (CEMP) for the BusConnects Galway – Cross-City Link (University Road to Dublin Road) Scheme, hereafter referred to as the Proposed Scheme.

The CEMP will be updated by Galway City Council (GCC) (the Employer for the construction works) prior to the commencement of the Construction Phase, so as to include any additional measures required pursuant to conditions attached to any decision to grant approval. GCC shall set out the Employer's Requirements in the Construction Contract including all applicable mitigation measures identified in this EIAR, as well as additional measures required pursuant to conditions attached to any decision to grant approval.

The CEMP comprises the construction mitigation measures, which are set out in the Environmental Impact Assessment Report (EIAR), and the Nature Impact Statement (NIS), and will be updated to include any additional measures required pursuant to conditions attached to An Bord Pleanála's decision.

The CEMP will need to be altered during the lifecycle of the Construction Phase to take account of monitoring results, permits, legislative changes, outcomes of third-party consultations etc. The appointed contractor will ensure that the CEMP remains up to date for the duration of the Construction Phase. The appointed contractor may propose modifications to the CEMP, however any such modifications, will not give rise to any impacts which are more significant than those already identified and assessed in the EIAR or NIS.

All of the measures set out in this CEMP will be implemented in full by the appointed contractor and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in the EIAR and NIS.

1.2 Purpose

The purpose of the CEMP is to set out the management framework for the delivery of the proposed construction works and to illustrate how the Proposed Scheme could be delivered in a logical, sensible, and safe sequence with the incorporation of specific Environmental Commitments, as set out in Section 1.9.

The CEMP will be used by the appointed contractor, and the appointed contractor personnel as a guidance document for the Construction Phase of the Proposed Scheme outlining procedures for the delivery of environmental mitigation measures and for addressing general day-to-day environmental issues that could arise during the Construction Phase of the Proposed Scheme.

1.3 Reference Documents

The CEMP has been prepared as part of the EIAR and the NIS, and should be read in conjunction with the following Proposed Scheme specific documents:

- The EIAR, with particular reference to Chapter 5 (Construction) of this EIAR;
- The NIS;
- The Construction Contract; and
- Copies of An Bord Pleanála's Order, Inspector's Report and associated documentation.

The appointed contractor will need to comply with all relevant environmental legislation and take account of published standards, accepted industry practice, national guidelines, and codes of best practice appropriate to the Proposed Scheme. The CEMP has been prepared in accordance with the following industry best practice guidance:

- TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (TII 2007), hereafter referred to as the TII Guidelines; and
- Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015).

1.4 Scope

This CEMP defines the approach to environmental management implementation. Compliance with the CEMP, the procedures, work practices and controls will be adhered to by all personnel employed during the Construction Phase of the Proposed Scheme.

Table 1 provides the contents of the CEMP, and where details can be found in this document.

Table 1: CEMP Contents

Content	Section of CEMP
Introduction	5.1.1
Purpose	5.1.2
Reference Documents	5.1.3
Scope	5.1.4
Proposed Scheme Details	5.1.5
Planning Consent	5.16
Contact Sheets	5.1.7
Roles and Responsibilities	5.1.8
Communications	5.1.9
Environmental Awareness Training	5.1.10
Compliance and Review	5.1.11
Environmental Commitments	5.1.12
Mitigation and Monitoring Schedule	5.1.13

Content	Section of CEMP
Construction Traffic Management Plan	5.2
Invasive Species Management Plan	5.3
Surface Water Management Plan	5.4
Construction and Demolition Resource and Waste Management Plan	5.5
Environmental Incident Response Plan	5.6

1.5 Proposed Scheme Details

Information on the Proposed Scheme will be included in this section of the CEMP. This information will assist those without detailed knowledge of the Proposed Scheme in quickly familiarising themselves with the key elements of the Proposed Scheme and will also assist those who have a need to examine, review or audit the CEMP.

Details will include a description of the key elements of the Proposed Scheme, an overview of the main works required at each section, the construction programme, construction methodology, construction plant and equipment requirements, details on the Construction Compounds, construction traffic management measures, and interfaces with other projects.

[GCC / appointed contractor shall insert Proposed Scheme details].

1.6 Planning Consent

If planning permission is granted for the Proposed Scheme, the entire contents of the planning consent will be inserted at this location.

[GCC / appointed contractor shall insert planning consent details].

1.7 Contact Sheets

Contact details of relevant personnel are required to ensure the efficient reporting of environmental incidents. It is essential that these contact details be frequently reviewed to ensure they are up to date. Contact details will include the organisation, position title, name, mobile phone number and email address of relevant personnel.

[GCC / appointed contractor shall insert contact details for the relevant personnel].

1.8 Roles and Responsibilities

Procurement of the appointed contractor by GCC (the Employer for the construction works), will involve the determination that the appointed contractor is competent to carry out the works, including the effective implementation of the mitigation measures. The appointed contractor will be required to plan and construct the Proposed Scheme construction works in accordance with the Employer's Requirements, and GCC will employ an Employer's Representative team with appropriate competence to administer and monitor the Construction Contract for compliance with the Employer's Requirements.

Information on the appointed contractor's organisational structure / duties and responsibilities will be provided in this section in the CEMP.

The assignment and communication of duties and responsibilities to individual named members will help ensure the successful implementation of the CEMP.

The TII Guidelines outline a typical organisational structure / roles that may be adopted. It is recognised that the actual titles used by the appointed contractor may vary, however, the appointed contractor should assign relevant duties and responsibilities to the appropriate equivalent person.

One of the roles identified in the TII Guidelines is that of an Environmental Manager (EM). The EM, or equivalent, will be suitably qualified, with sufficient training, experience and knowledge appropriate to the nature of the task to be undertaken. The EM will be responsible for co-ordinating the day-to-day management of environmental impacts during the Construction Phase and for assisting and advising the appointed contractor when programming construction activities and devising methodologies, taking cognisance of the Environmental Commitments. The EM will be responsible for performing inspections as deemed necessary. In addition, the EM will deal with licencing and permit issues, keep up to date with relevant environmental best practice and legislative changes, engage in personnel training, manage responses to environmental incidents and engage environmental contractors as and when required.

[GCC / appointed contractor shall insert the appointed contractor's organisational structure / duties and responsibilities].

1.9 Communications

The procedures adopted for internal and external communication of information regarding the specific elements of the Proposed Scheme will be agreed between GCC and the appointed contractor prior to construction as set out in the Construction Contract.

The appointed contractor will put in place a Communications Plan in accordance with the Employer's Requirements. The Plan will provide a mechanism for members of the public to communicate with GCC and the appointed contractor, and for GCC and the appointed contractor to communicate important information on various aspects of the Proposed Scheme to the public. The Plan will include procedures to inform members of the community directly affected by the Construction Phase on schedules for any activity of a particularly disruptive nature which is likely to impinge on their property such as boundary works, road closures and diversions, and any mitigating actions that are being taken to minimise such disruption.

1.10 Environmental Awareness Training

Copies of the CEMP will be made available to all personnel. All appointed contractor personnel will receive relevant and appropriate training to ensure that they have the appropriate knowledge to successfully implement the CEMP.

Where a specific management plan has been devised for a works activity (e.g., working in an area where invasive species are present), all appointed contractor personnel involved in that activity will be given a toolbox talk outlining the relevant Environmental Commitments.

1.11 Compliance and Review

The EM or equivalent, will carry out environmental inspections at appropriate intervals throughout the Construction Phase.

The environmental inspections will ensure that the works are undertaken in compliance with the CEMP and all other planning application documents. Where appropriate and if required, the EM may arrange to be accompanied on these environmental inspections by suitably qualified professionals (e.g., arborist, ecologist, archaeologist). The CEMP will be developed further by the appointed contractor to include further details of inspection procedures.

The Construction Contract documents will require the appointed contractor to further develop the CEMP within 28 days after receiving notice of Commencement of Works from GCC. The EM, and GCC will carry out audits of the CEMP at designated intervals, to determine whether the CEMP is effective in ensuring that the appointed contractor meets all the Environmental Commitments. All changes to the CEMP will be made by the EM and approved by GCC.

1.12 Environmental Commitments

The Schedule of Environmental Commitments will comprise the following:

- The Construction Phase mitigation and monitoring measures as outlined in Chapter 6 (Traffic & Transport) to Chapter 20 (Cumulative Impacts & Environmental Interactions) of this EIAR, summarised in Chapter 21 (Summary of Mitigation & Monitoring Measures) of this EIAR, and in Table 2;
- Any commitments arising during the statutory planning process up to and including the Oral Hearing;
- Any commitments set out in the Construction Contract documents; and
- Any conditions and / or modifications imposed by An Bord Pleanála, should they grant approval for the Proposed Scheme.

The CEMP will include the Schedule of Environmental Commitments together with the relative specification, evidence, and responsibilities of how each commitment will be met where necessary. The appointed contractor will be required to comply with all Environmental Commitments, and all applicable legislation, including relevant standards, codes of best practice and guidelines.

1.13 Mitigation and Monitoring Schedule

Table 2 summarises the Construction Phase mitigation (i.e., which the appointed contractor will implement), outlined in the relevant EIAR technical assessment chapters. Table 2 should be read in conjunction with the relevant technical assessment chapter.

Where appropriate, the specific location to which the mitigation relates to is identified and where the mitigation measure may be applicable along the extent of the Proposed Scheme, the location is given as ‘Throughout (as required)’. Note that in certain instances, a mitigation measure may be relevant to more than one environmental aspect.

Table 2: Mitigation and Monitoring Measures (Construction Phase)

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
Chapter 6 (Traffic & Transport)	TT1	6.6	Throughout (as required)	The CEMP will be implemented (and developed further as required) by the appointed contractor. A detailed Construction Traffic Management Plan has been prepared and will subsequently be updated by the contractor prior to construction, including Temporary Traffic Management arrangement prepared in accordance with Department of Transport's 'Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks'. The plan will be agreed with GCC and will include measures to minimise the impacts associated with the Construction Phase upon the peak periods of the day.
Chapter 7 (Air Quality)	AQ1	7.5.1	Construction Compound and throughout (as required)	A series of mitigation measures will be implemented by the appointed contractor to reduce the dust nuisance impacts: • Fully enclose structures with screens during demolition to minimise dust dispersion; • Public roads outside the Proposed Scheme will be regularly inspected for cleanliness and cleaned as necessary; • Material handling systems and stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays (or similar dust suppression methods) will be used as required if particularly dusty activities associated with the construction contract are necessary during dry or windy periods; • During movement of dust generating materials both on and off-site, trucks will be covered with tarpaulin and before entrance onto public roads, trucks will be checked to ensure the tarpaulins are properly in place; • The appointed contractor will provide a site hoarding of 2.4m height along boundaries where works are taking place adjacent to ecological sensitive receptors(Lough Atalia and Lough Corrib) and at the Harbour Construction Compounds, which will assist in minimising the potential for dust impacts off-site. The appointed contractor will keep the effectiveness of the mitigation measures under review and revise them as necessary. In the event of dust nuisance occurring outside the works boundary associated with the Proposed Scheme occurring outside the works boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem.
	AQ2	7.5.1.2	Throughout (as required)	The following monitoring measures, will be implemented for the construction phase of the proposed development: • The contractor will undertake on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to Galway City Council on

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				request. The frequency of the inspections will be increased during site activities with a high potential to produce dust are being carried out. • Dust monitoring will be undertaken at the three nearest sensitive receptors (with agreement from the landowner) to the works during the construction phase. The TA Luft dust deposition limit values of 350 mg/m^2/day applied as a 30-day average.
Chapter 8 (Climate)	CL1	8.6.1	Throughout (as required)	A series of mitigation measures have been incorporated into the Proposed Scheme with the goal of reducing the embodied carbon associated with the Construction Phase. These mitigation measures include: • The replacement, where feasible, of concrete containing Portland cement with concrete containing ground granulated blast furnace slag (GGBS); • The Proposed Scheme will minimise wastage of materials due to poor timing or over ordering on site thus helping to minimise the embodied carbon footprint of the Proposed Scheme; • Where practicable, opportunities for materials reuse will be incorporated within the extent of the Proposed Scheme including the use of reclaimed asphalt and recycled aggregate; and • Where practicable, materials will be sourced locally to reduce the embodied emissions associated with transport.
Chapter 9 (Noise & Vibration)	NV1	9.5.1.1	Throughout (as required)	The appointed contractor will be required to take specific noise abatement measures to the extent required and comply with the recommendations of BS 5228–1 (BSI 2014a) and European Communities Noise Emissions by Equipment for Use Outdoors (Amendment) Regulations 2006 (S.I. No 241/2006). The mitigation measures outlined below for the Construction Phase have also been included in the Construction and Environmental Management Plan (Appendix 5.1 in Volume 4 of this EIAR). These measures will ensure that: • During the Construction Phase, the appointed contractor will be required to manage the works to comply with the limits detailed in Section 9.2.4.1 in 0of this EIAR using methods outlined in BS 5228–1 (BSI 2014a); • The best means practicable, including proper maintenance of plant and equipment, will be employed to minimise the noise produced by on site operations.
	NV2	9.5.1.1	Throughout (as required)	The appointed contractor will put in place the most appropriate noise control measures depending on the level of noise reduction required at individual working areas i.e., based on the construction threshold values for noise and vibration set out in Table 9.5 and Table 9.8 in Chapter 9 of this EIAR. Reference to Table 9.25 in

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				Chapter 9 of this EIAR indicates that intrusive works occurring within 70 m of NSLs will need specific noise control measures to reduce impacts depending on time period over which they will occur, i.e. daytime or evening.
	NV3	9.5.1.1	Throughout (as required)	The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item of plant will be selected wherever practicable. Should a particular item of plant already on the site be found to generate unexpectedly high noise levels, the first action will be to identify whether or not the item can be replaced with a quieter alternative. For static plant such as compressors and generators used at work areas such as Construction Compounds etc., the units will be supplied with manufacturers' proprietary acoustic enclosures where practicable. The contractor will evaluate the choice of excavation, breaking or other working method taking into account various ground conditions and site constraints. Where possible, where alternative lower noise generating equipment are available that will provide structural / excavation / breaking results, these will be selected to minimise potential disturbance.
	NV4	9.5.1.1	Construction Compound and throughout (as required)	The following measures will be implemented by the appointed contractor to control noise levels at source in order to remain below the threshold values for noise set out in Table 9.5 in Chapter 9 (Noise and Vibration) of Volume 2 of this EIAR, which relate to specific site considerations: • For mobile plant items such as dump trucks, planers, excavators and loaders, the installation of an acoustic exhaust, utilising an acoustic canopy to replace the normal engine cover and/or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB; • For percussive tools such as pneumatic concrete breakers and tools a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensuring any leaks in the air lines are sealed; • Construction Compounds are located in close proximity to NSLs (refer to Table 9.24 in Chapter 9 (Noise and Vibration) of Volume 2 of this EIAR) and will therefore incorporate a strict noise control policy relating to materials handling. Noisy items of plant will be sited away from noise sensitive boundaries. • Where compressors, generators and pumps are located in proximity to NSLs and have potential to exceed the construction noise thresholds, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation; and • Resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds, while other noise nuisance can be controlled by fixing resilient materials in between the surfaces in contact.

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
	NV5	9.5.1.1	Throughout (as required)	Erection of localised demountable enclosures or screens will be used around breakers or drill bits, as required, when in operation in proximity to NSLs boundaries with the potential to exceed the construction noise thresholds. Annex B of BS 5228–1 (BSI 2014a) (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on site from standard materials.
	NV6	9.5.1.1	Construction Compound	The appointed contractor will provide a site hoarding of 2.4m height along noise sensitive boundaries, at a minimum, at the Construction Compounds.
	NV7	9.5.1.1	Construction Compound	Careful planning of the Construction Compounds including the placement of site buildings such as offices and stores between the site and noise sensitive locations will also be considered by the appointed contractor.
	NV8	9.5.1.1	Throughout (as required)	It is generally envisaged that construction working hours will be between 07:00hr and 19:00hrs on weekdays. Night-time, Saturday and Sunday working will be required during certain periods in order to minimise the impact on road traffic movement during the daytime. The planning of such works will take consideration of sensitive receptors, in particular any nearby residential areas.
	NV9	9.5.1.1	Throughout (as required)	Construction activities will be scheduled in a manner that reflects the location of the site and the nature of neighbouring properties. Construction activities / plant items will be considered with respect to their potential to exceed construction noise thresholds at NSLs and will be scheduled according to their noise level, proximity to sensitive locations and possible options for noise control. In situations where an activity with potential for exceedance of construction noise thresholds is scheduled (e.g. road widening and utility diversions or activities with similar noise levels identified in Table 9.25 in Chapter 9 of this EIAR) other construction activities will be scheduled to not result in significant cumulative noise levels.
	NV10	9.5.1.1	Throughout (as required)	GCC will establish clear forms of communication that will involve the appointed contractor and NSLs in proximity to the works so that residents or building occupants are aware of the likely duration of activities likely to generate noise or vibration that are potentially significant as set out in Table 9.5 and Table 9.8 in Chapter 9 (Noise and Vibration) of this EIAR.
	NV11	9.5.1.1	Throughout (as required)	During the Construction Phase noise monitoring will be undertaken at representative NSLs to evaluate and inform the requirement and/ or implementation of noise management measures. Noise monitoring will be conducted in accordance with ISO 1996–1 (ISO 2016) and ISO 1996–2 (ISO 2017). The selection of monitoring locations will be based on the nearest representative NSLs to the working area which will progress along the length of the Proposed Scheme.

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
	NV12	9.5.1.2	Throughout (as required)	In the case of vibration levels giving rise to human discomfort, to minimise such impacts the appointed contractor will implement the following mitigation measures during the Construction Phase: • A clear communication programme will be established by GCC to inform adjacent building occupants in advance of any potential intrusive works which may give rise to vibration levels likely to result in significant effects as per Table 9.9 in Chapter 9 of this EIAR; • Activities capable of generating significant vibration effects with respect to human response (as per Table 9.9 in Chapter 9 this EIAR) will be restricted to daytime hours only, as far as practicable; and • Appropriate vibration isolation shall be applied to plant (such as resilient mounts to pumps and generators), where required and where feasible.
Chapter 11 (Human Health)	HH1	11.5	Throughout (as required)	Any mitigation or monitoring requirements in relation to effects on human health are properly addressed by the measures set out in the chapters which assess effects on the vectors through which the scheme has potential to cause likely and significant effects on human health.
Chapter 12 (Biodiversity)	BD1	12.6.1	Through (as required)	The Contractor will be required to enforce the CEMP which will include the following construction management measures. An Ecological Clerk of Works (EcOW) will be employed to maintain a watching brief on the proposed mitigation measures included for the protection of European sites.
	BD2	12.6.1.1	Throughout (as required)	**Environmental Incident Response Plan** In the event of an environmental emergency, all personnel will react quickly and adhere to the Environmental Incident Response Plan procedure, refer to Section 5.6. The following outlines the information on the types of emergencies which must be communicated to site staff: • Release of hazardous substance – fuel or oil spill. • Concrete spill or release of concrete. • Flood event – extreme rainfall or rising river level event. • Environmental buffers and exclusion zones breach. • Housekeeping of materials and waste storage areas breach. • Stop work orders due to environmental issue or concern (e.g. threat to ecological feature).
	BD3	12.6.1.2	Throughout (as required)	**Invasive Species Management Plan**

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				Refer to the CEMP (Appendix 5.1 of Volume 4 this EIAR) for full details on the management of the potential for invasive species.
	BD4	12.6.1.3	Throughout (as required)	**Habitats & Flora** In general, with regard to biodiversity any felling of trees will take place outside the Bird nesting season March 1st to August 31st.
	BD5	12.6.1.4	Construction Compounds and throughout (as required)	**Habitat Degradation – Surface Water Quality** This CEMP includes specific management measures for the prevention of the pollution of water courses from dust, suspended solids or chemicals are proposed. These measures accord with the principles set out in industry guidelines including CIRIA's report 'C532: Control of water pollution from construction sites'. The following mitigation measures will be employed: **River Corrib at Salmon Weir Bridge** • As a precaution, the control of dust emissions will be enforced by providing a suitable barrier to prevent dust entering the River Corrib at the Salmon Weir Bridge for the length of the Scheme required to prevent emissions to Persse's Distillery River, the main channel of the river and Friar's River at Newtownsmith from the proposed disturbance area. The barrier will be inspected on a weekly basis for gaps or displacement and reinstated when required. • A record of inspection and efficacy of the barrier will be noted in the printed version of the CEMP as an inspection sheet. The record of inspections will be maintained on site and will be available upon request by relevant authorities. • Details of the dust minimisation measures are included in a Construction and Demolition Resource and Waste Management Plan, as described in this CEMP. **University Road at Ward's Shop** • The control of surface water discharge will be enforced by providing a suitable barrier to prevent surface water entering the Eglinton Canal at gaps in the boundary wall leading to the canal and for the length of canal required to prevent drainage to the canal from the proposed disturbance area. The barrier will comprise a silt fence placed with sand bags or a suitable supporting frame. The silt fence will be inspected on a weekly basis for gaps or displacement and reinstated when required.

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				• A record of inspection and efficacy of the barrier will be noted in the printed version of the CEMP as an inspection sheet. The record of inspections will be maintained on site and will be available upon request by relevant authorities. **Lough Atalia Playground Outfall** • The works at Lough Atalia Playground will avoid potential disturbance to wintering birds by undertaking the works outside the Winter bird period October to March. • The works at Lough Atalia Playground will be timed to avoid 'spring' high water times and inclement weather (southerly/south-westerly winds) in order to avoid washing of surface water to the sea. Tide times are available from several websites. The delay time for the ebb and flow time to Lough Atalia will be determined by the Contractor or representative Resident Engineer. • The control of surface water discharge will be enforced by firstly providing a temporary sandbag dam at the headwall of the proposed outfall prior to work commencing in this area at low tide. The temporary dam will comprise 1 tonne bags (or similar suitable size) placed at low tide at the foot of the rock armour berm in this area. A silt fence or suitable geotextile barrier will be placed inside the dam and secured using smaller sandbags as required to form an impermeable barrier to prevent hydrocarbon and contaminated surface water runoff to Lough Atalia. • The control of surface water discharge will be enforced by providing a suitable barrier to prevent surface water entering Lough Atalia in the proposed trench leading to the outfall. The barrier will comprise a silt fence placed with sand bags or a suitable supporting frame. A typical silt fence consists of a piece of synthetic filter fabric (also called a geotextile) stretched between a series of wooden or metal fence stakes along a horizontal contour level, (see Diagram 12.12 in Chapter 12 of the EIAR) for sample details. The stakes will be installed on the downhill side of the fence, and the bottom edge of the fabric will be trenched into the soil and backfilled on the uphill side. The fence will be installed on a site before soil disturbance begins and is placed down-slope from the disturbance area. The design/placement of the silt fence will create a pooling of runoff, which then allows sedimentation to occur. The silt fence fabric becomes "blocked off" with fine soil particles and clean water can seep through the fabric. The silt fence will be inspected on a weekly basis for gaps or displacement and reinstated when required. • A record of inspection and efficacy will be noted in the printed version of the CEMP as an inspection sheet. The record of inspections will be maintained on site and will be available upon request by relevant authorities.

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				Lough Atalia adjacent to the Dublin Road • The works at the Lough Atalia Dublin Road area will be timed to avoid 'spring' high water times and inclement weather (southerly/south-westerly winds) in order to avoid washing of surface water to the sea. Tide times are available from several websites. The delay time for the ebb and flow time to Lough Atalia will be determined by the Contractor or representative Resident Engineer. • The control of surface water discharge will be enforced by providing a suitable barrier to prevent surface water entering Lough Atalia. The barrier will comprise a silt fence placed with sand bags or a suitable supporting frame such as a staked fence. A typical silt fence consists of a piece of synthetic filter fabric (also called a geotextile) stretched between a series of wooden or metal fence stakes along a horizontal contour level, (see Diagram 12.12 in Chapter 12 of the EIAR) for sample details. The stakes will be installed on the downhill side of the fence, and the bottom edge of the fabric can be trenched into the soil and backfilled on the uphill side. The fence will be installed on a site before soil disturbance begins and is placed down-slope from the disturbance area. The design/placement of the silt fence should create a pooling of runoff, which then allows sedimentation to occur. The silt fence fabric becomes "blocked off" with fine soil particles and clean water can seep through the fabric. • The silt fence will be inspected on a weekly basis for gaps or displacement and reinstated when required. • A record of inspection and efficacy will be noted in the printed version of the CEMP as an inspection sheet. The record of inspections will be maintained on site and will be available upon request by relevant authorities. **All Working Areas adjacent to water courses/water bodies** • Tools and equipment will not be cleaned in grassland or aquatic areas. • Chemicals used will be stored in sealed containers. • Chemicals shall be applied in such a way as to avoid any spillage or leakage. • All refuelling, oiling and greasing will take place above drip trays or on an impermeable surface which provides protection to underground strata and away from grassland as far as reasonably practicable. Vehicles will not be left unattended during refuelling. • All plant shall be well maintained with any fuel or oil drips attended to on an ongoing basis. • Any minor spillage during this process will be cleaned up immediately. • Best practice in bulk-liquid concrete management addressing pouring and handling, secure shuttering / form-work, adequate curing times will be implemented.

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				• Wash water from cleaning ready mix concrete lorries and mixers may be contaminated with cement and is therefore highly alkaline, therefore, washing will not be permitted on site. • Disposal of raw or uncured waste concrete will be controlled to ensure that the aquatic environment will not be impacted. For the management of excavation and spoil, the Contractor will: • Ensure all spoil and excavated materials will be stored in the construction compound or removed to an appropriate waste facility; • Ensure stockpiles and adjacent features of drainage infrastructure will be monitored and maintained appropriately; • Erect all protective fencing; • Implement the Surface Water Management Plan (including the installation of drainage infrastructure) as detailed in the CEMP (Appendix 5.1 in Volume 4 of this EIAR) prior to excavation and include areas dedicated to spoil storage with the drainage infrastructure; and • The Construction and Demolition Resource and Waste Management Plan, as described in the CEMP (Appendix 5.1 in Volume 4 of this EIAR) identifies any material such as dust, sand, rubble, concrete that may be generated during demolition works and address its storage and appropriate removal from the site to avoid pathways identified as having connectivity with the River Corrib. Site personnel will be trained in the importance of preventing pollution and the mitigation measures described here to ensure same. A record of this training will be maintained. The Construction Environmental Management Plan will be read and signed by the Contractor/Site Foreman and made available to the EcOW.
	BD6	12.6.1.5	Throughout (as required)	**Otters** A worst-case scenario may be considered where a pollution event would indirectly affect otters or food availability to otters. The Construction Environmental Management Plan which includes specific management measures for the prevention of the pollution of water courses from suspended solids or chemicals.
	BD7	12.6.1.5	Throughout (as required)	**Bats** Ground level potential roost feature surveys conducted on trees within the study did not reveal any roosting bats. There are no further requirements for mitigation for bats.

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				The roofs of buildings at the Headford Road and St. Brendan's Avenue are relatively recently upgraded and well-sealed with limited access for bats. However, as a precaution, an internal inspection of the attic spaces will be undertaken at an appropriate time prior to demolition in order to rule out the presence of bats. If any are recorded, specific mitigation measures which may require a derogation license from the NPWS will be implemented.
	BD8	12.6.1.5	Throughout (as required)	**Seals** A worst-case scenario may be considered where a pollution event would indirectly affect otters of food availability to seals. This Construction Environmental Management Plan includes specific management measures for the prevention of the pollution of water courses from suspended solids or chemicals.
	BD9	12.6.1.5	Throughout (as required)	**Salmonids** A worst-case scenario may be considered where a pollution event would affect water quality and threaten salmonids. This Construction Environmental Management includes specific management measures for the prevention of the pollution of water courses from suspended solids or chemicals.
	BD10	12.6.1.5	Throughout (as required)	**Lamprey** A worst-case scenario may be considered where a pollution event would indirectly affect lampreys. This CEMP includes specific management measures for the prevention of the pollution of water courses from suspended solids or chemicals.
	BD11	12.6.1.5	Lough Atalia Playground	**Birds** Disturbance / Displacement Any felling, clearing or pruning of vegetation will take place outside the Bird nesting season March 1st to August 31st. The proposed works at the outfall at Lough Atalia Playground have the potential to disturb wintering birds in these areas. Potential impacts will be avoided by undertaking the works at Lough Atalia Playground outside the Winter bird period October to March.
	BD13	12.6.3.1	Throughout (as required)	An initial site environmental induction and ongoing training will be provided to communicate the main provisions of this environmental plan to all site personnel.

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				Two-way communication will be encouraged to promote a culture of environmental protection. The following outlines the information which must be communicated to site staff: • Environmental procedures of the CEMP; • Environmental buffers and exclusion zones; • Housekeeping of materials and waste storage areas; and • Environmental emergency response plan. Prior to any works, all personnel will receive an on-site induction relating to operations adjacent to watercourses and the environmentally sensitive nature of the River Corrib and to re-emphasise the precautions that are required as well as the construction management measures to be implemented. Galway City Council will also ensure that the engineer setting out the works is fully aware of the ecological constraints and construction management requirements.
Chapter 13 (Water)	WT1	13.5	Throughout as required	Construction works will take place in accordance with this CEMP. The outline Surface Water Management Plan (SWMP), which will form part of the CEMP sets out the mitigation measures that are in place to minimise pollution discharge into local water courses.
	WT2	13.5.1	Throughout (as required)	The mitigation measures proposed for management of surface runoff are generally contained in good practice guidance documents that should be adhered to during the construction over or near water bodies. Some of the relevant guidance documents include: • Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters - Inland Fisheries Ireland, 2016; • CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors; and • CIRIA C648 Control of Water Pollution from Constructional Sites Following on from the above guidelines, the following general and specific mitigation measures are outlined: • Appropriate timing of the works to avoid flooding seasons and water pollution incidents; • A sit boundary fence should be constructed around the construction footprint with adequate vegetation buffer to prevent unintentional discharge to adjacent watercourse;

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				• A silt fence must be used during construction at the outfall at Lough Atalia where sediment laden runoff is likely to be generated; • While working near water bodies (Corrib River and Lough Atalia), it is required to capture and treat all surface runoff before discharging to these water bodies; and • Sampling and monitoring of storm water discharges from construction sites, the location and frequency as determined by the Environmental Clerk of Works (ECoW). Parameters of interest may include Turbidity (or TSS), pH, and hydrocarbons. A SWMP is provided as part of the CEMP. This includes an outline of generic mitigation measures for the Construction Phase. Key management measures included: • A requirement for an Emergency Incident Response Plan (PIRP); • Construction Compounds management including the storage of fuels and materials; • Control of sediment generation and discharge; • Provision of SUDs (attenuation pond and petrol interceptor) should be implemented before discharge to the receiving waters; • Use of pre cast concrete where possible or construction method to approved by ECoW; and • Management of vehicles and plant including refuelling and wheel wash facilities -spills and discharge are contained and prevented from entering the surface water receptor.
	WT3	13.5.1	Throughout (as required)	As outlined in the SWMP, the Appointed Contractor shall carry out visual monitoring of surface water control measures (settlement tanks, silt fences, fuel storage areas etc.) on a daily basis. In addition, weekly visual inspections of the water bodies in proximity to Proposed Scheme will be carried out by the Appointed Contractor.
Chapter 14 (Land, Soils, Geology &Hydrogeology)	LSGH1	14.5.1.1	Throughout (as required)	<u>Loss or Damage of Topsoil</u> The appointed contractor will ensure that excavations shall be kept to a minimum, using shoring or trench boxes where appropriate. For more extensive excavations, a temporary works designer shall be appointed by the appointed contractor to design excavation support measures in accordance with all relevant guidelines that minimise the excavation of contaminated ground.
	LSGH2	14.5.1.1	Throughout (as required)	<u>Loss or Damage of Topsoil</u> The appointed contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for reuse.

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
	LSGH3	14.5.1.1	Throughout (as required)	Loss or Damage of Topsoil Samples of ground suspected of contamination will be tested for contamination by the appointed contractor during the ground investigation and ground excavated from these areas will be disposed of to a suitably licensed or permitted site in accordance with the current Irish waste management legislation.
	LSGH4	14.5.1.1	Throughout (as required)	Loss or Damage of Topsoil Any dewatering in areas of contaminated ground will be designed by the appointed contractor to minimise the mobilisation of contaminants into the surrounding environment.
	LSGH5	14.5.1.2	Throughout (as required)	Pollution of Soil and Groundwater Good construction management practices, as outlined in the CIRIA guidance, Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams *et al*., 2001), will be employed by the appointed contractor to minimise the risk of transmission of hazardous materials as well as pollution of adjacent watercourses and groundwater.
	LSGH6	14.5.1.2	Throughout (as required)	Pollution of Soil and Groundwater The construction management of the site by the appointed contractor will take account of the recommendations of the CIRIA guidance Control of Water Pollution from Construction Sites – Guidance for consultants and contractors (Masters-Williams et al., 2001) to minimise as far as possible the risk of soil, groundwater and surface water contamination.
	LSGH7	14.5.1.2	Construction Compounds and throughout (as required)	Pollution of Soil and Groundwater Measures to be implemented by the appointed contractor to minimise the risk of spills and contamination of soils and waters include: • Employing only competent and experienced workforce, and site-specific training in pollution risks and preventative measures for site managers, foremen and workforce, including all sub-contractors,; • Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, e.g. by a roll-over bund, raised kerb, ramps or stepped access; • The location of any fuel storage facilities shall be considered in the design of the Construction Compounds. These are to be designed in accordance with relevant guidelines and codes of best practice and will be fully bunded; • Good housekeeping at the site (daily site clean-ups, use of disposal bins, etc.) during the entire Construction Phase;

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				• All concrete mixing and batching activities will be located in areas away from watercourse and drains; • Potential pollutants to be adequately secured against vandalism; • Provision of proper containment of potential pollutants according to codes of best practice; • Thorough control during the entire Construction Phase to ensure that any spillage is identified at early stage and subsequently effectively contained and managed; and • Spill kits will be provided and kept close to the storage area. Staff to be trained on how to use spill kits correctly.
	LSGH8	14.5.1.2	Throughout (as required)	An Environmental Incident Response Plan will be implemented by the appointed contractor, which will identify the actions to be taken in the event of a pollution incident. It will address such aspects as containment measures, emergency discharge routes, a list of appropriate equipment and clean-up materials and notification procedures to inform the relevant environmental protection authority.
	LSGH9	14.5.1.2	Throughout (as required)	Sediment control methods are outlined in the Surface Water Management Plan and these will be implemented by the appointed contractor.
	LSGH10	14.5.1.4	Lough Atalia	<u>Pollution of Soil and Groundwater</u> As detailed in the Land Contamination Remedial Strategy (Appendix 14.5) a risk assessment shall be carried out by the designer to establish a concentration of cadmium in the soil that does not present a risk to the quality of water entering Lough Atalia. Soil, groundwater and surface water verification testing shall be carried out by the contractor during the construction stage to confirm the findings of the risk assessment.
Chapter 15 (Archaeological, Cultural Heritage & Architectural Heritage)	ACHAH1	n/a	Throughout (as required)	GCC will procure the services of a suitably-qualified archaeologist as part of its Employer's Representative team administering and monitoring the works.
	ACHAH2	15.6.1.1	Throughout (as required)	Works impacting the sites of the National Monument, comprising Galway Town Defences (AH13/BH75), will require Ministerial Consent. A wade survey and underwater archaeological assessment of the area surrounding the new outfall towards the northern end of Lough Atalia will be carried out by a suitably qualified archaeologist under licence to the DoHLGH. If any features of archaeological potential are identified by the survey and assessment further archaeological mitigation may be required, such as preservation in-situ or by record All ground disturbances associated with the Proposed Scheme will be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the DHLGH.
	ACHAH3	15.6.1.2	Throughout (as required)	Works impacting the National Monument comprising Galway Town Defences (AH13/BH75) will require Ministerial Consent All statues/historic street furniture (BH44, BH52, BH67) and works along historic bridges, which fall within the Proposed Scheme area will require hoarding during construction to protect from potential damage during ground disturbances. If hoarding in-situ is not possible, statues/street furniture will require careful removal by a conservation specialist to be stored securely and re-installed at an appropriate location, in consultation with the Galway Heritage Officer.
	ACHAH4	15.6.1.2	Throughout (as required)	Grave monument BH65 falls wholly within the Proposed Scheme area and will require hoarding to prevent damage during groundworks.
	ACHAH5	15.6.1.2	Throughout (as required)	BH47 (Ceannt Station – a short section of retaining wall). To be subject to a full written and measured survey prior to construction going ahead.
	ACHAH6	15.6.1.3	Throughout (as required)	Where cultural heritage sites such as statues/historic street furniture (CH03, CH04, CH05) fall within the Proposed Scheme area they will require hoarding during works to protect from potential damage during ground disturbances. If hoarding in-situ is not possible, the items will require careful removal by a conservation specialist to be stored securely and re-installed at an appropriate location, in consultation with the Galway Heritage Officer.
	ACHAH7	15.6.1.3	Throughout (as required)	A cobbled road surface to the front of Town Hall Theatre and historic paving/kerbing and bollards along St Vincent's Street/Waterside/Courthouse Square (CH11) fall within the Proposed Scheme area. These features will be recorded and photographed before being lifted under supervision of a suitably qualified conservation specialist, for secure storage and re-use (where appropriate), in consultation with the Galway Heritage Officer. A full written and photographic record will be made of Eyre Square (CH10) and its current character and landscape layout. This will be carried out by a suitably qualified professional. Lough Atlia dock walls (CH12) will be hoarded off during construction and all excavation works to the rear of the wall supervised by an archaeologist. The methodology for repair of the dock wall will be agreed in advance with Galway Heritage Officer.

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
Chapter 16 (Landscape (Townscape) & Visual)	LV1	16.5.1.1	Throughout (as required)	Prior to the commencement of works, the appointed contractor will prepare a detailed CEMP.
	LV2	16.5.1.1	Throughout (as required)	In addition to the management of all construction works in accordance with best methodologies and practice, the following measures are proposed for the mitigation of landscape/townscape and visual impacts: • Retained existing trees, planting, features etc. will be protected with temporary protective fencing at the boundary of proposed works areas. Existing trees along will be protected with fencing in accordance with BS5837:2012: Trees in relation to Construction and TII's Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub. • Where existing trees, hedges, and/or plantings are removed from temporary acquisition areas, new planting and paving will be provided in replacement of those removed. In general, unless not feasible or practicable, new plant species will match that of those removed. Replacement plant sizes will be that readily available and therefore, is unlikely to match the maturity of plants removed (especially in the case of trees or larger plants). However, being of the same or similar species, maturity similar to that of the existing can be achieved in time. • New boundaries to match the existing will be established on the setback line to match the existing boundary. The construction and provision of the new boundaries is to take account of the location of existing trees, other plantings, gradients, drainage, property features and access arrangements so as to minimise additional indirect effects. • The Proposed Scheme will provide for the planting of new street trees both for mitigation of tree removal and for overall enhancement of streetscape environment. Species selected shall be appropriate to the urban street environment and to the characteristics of the specific location. This measure is applied along the full length of the Proposed Scheme. Proposals for the treatment of the public realm within the streetscape effected by the Proposed Scheme will have regard to the existing character of the street or location, Galway Public Realm Strategy and to opportunities for enhancement of the public realm and the streetscape. Proposals will have regard to historic details and features, to the quality of existing and proposed materials, to the reduction of clutter, ease of legibility, and management and maintenance requirements.
	LV4	16.5.1.3	Throughout (as required)	The works will have continuous monitoring under the Construction Environmental Management Plan to ensure adequate protection of trees, built heritage features., amenity and public realm areas outside of the construction works.

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
	LV5	16.5.1.3	Throughout (as required)	Any construction within close proximity to the retained trees will be undertaken in accordance with approved method statements prepared by the construction contractor under the direct supervision of a suitably qualified consultant Arboriculturist. Therefore, during the construction works, a professionally qualified Arboriculturist is proposed to be retained by the principal contractor or site manager to monitor and advice on any works within the root protection area (RPA) of retained trees to ensure successful retention and planning compliance.
	LV6	16.5.1.3	Throughout (as required)	On the completion of the construction works, all trees and vegetation retained is to be reviewed by the project Arboriculturist and any necessary remedial tree surgery works required to promote health and safety are to be implemented.
Chapter 17 (Waste & Resources)	WR1	17.5.1	Throughout (as required)	A Construction and Demolition Resource and Waste Management Plan (CDRWMP) has been prepared and this will be implemented (and updated as necessary) by the appointed contractor.
	WR2	17.5.1	Throughout (as required)	The following measures will be implemented during construction, where practicable, by the appointed contractor, to ensure the maximum quantity of material is reused on the Proposed Scheme and to contribute to achieving the objectives set out in the National Waste Action Plan as follows: • Stockpiling of existing sub-base, capping layer and topsoil material generated on-site for direct reuse in the Proposed Scheme where practicable in the proposed construction compounds (subject to material quality testing to ensure it is suitable for its proposed end use); and • Recycled aggregates and reclaimed asphalt will be specified in the Proposed Scheme, where practicable.
	WR3	17.5.1	Throughout (as required)	The following management measures will be implemented in so far as reasonably practicable: • Where waste generation cannot be avoided, waste disposal will be minimised; • Opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Scheme; • Possibilities for reuse of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use; • Where excavated material cannot be reused within the Proposed Scheme works, material will be sent for recovery or recycling; • Source segregation: Metal, timber, glass and other recyclable material will be segregated (and waste stream colour-coding will be used) during construction works and removed off site to a permitted / licensed facility for recycling; • Material management: 'Just-in-time' delivery, where practicable, will be used to minimise material wastage;

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				• General construction waste and by-products will01 be reused within the Proposed Scheme, where practicable, or appropriately reused (in accordance with Article 27 of the Waste Directive Regulations), recovered, recycled or disposed of off-site, as arranged by the appointed contractor; and • Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation. • Waste Auditing: The quantity and types of waste and materials leaving site during the Construction Phase will be recorded by the appointed contractor. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity to each facility. Records will show which material is recovered, which is recycled and which is disposed of. • Where Article 27 notifications are required in relation to the Proposed Scheme, the appointed contractor will complete and submit these Article 27 notifications to the EPA for by-product reuse. • Any off-site interim storage or waste management facilities for excavated material will have the appropriate EPA licence, Waste Facility Permit or Certificate of Registration, as appropriate, in place. • The relevant appropriate waste authorisation will be in place for all facilities that wastes are delivered to (i.e., EPA Licence, Waste Facility Permit or Certificate of Registration).
Chapter 18 (Material Assets)	MA1	18.6.1	Throughout (as required)	Where there are interfaces with existing utility infrastructure, protection in place or diversion as necessary is proposed to prevent long-term interruption to the provision of the affected services.
	MA2	18.6.1	Throughout (as required)	All possible precautions will be taken by the appointed contractor to avoid unplanned interruptions to any services during the Construction Phase of the Proposed Scheme. This will include appropriate investigation by the appointed contractor to identify the location of all utility infrastructure within the working areas prior to the commencement of excavation works. Where works are required in and around utility infrastructure, precautions will be implemented by the appointed contractor to protect the infrastructure from damage in accordance with best practice methodologies and the requirements of the utility companies where practicable. Protection measures during construction will include warning signs and markings indicating the location of utility infrastructure, safe digging techniques in the vicinity of known utilities, and in certain circumstances where possible, isolation of the section of infrastructure during works in the immediate vicinity.
	MA3	18.6.1	Throughout (as required)	All utility companies for which diversions are proposed will continue to be consulted when designing any diversions to ensure that proposed diversions conform to the utility provider's requirements, where practicable, and to ensure that service interruptions are kept to a minimum.
	MA4	18.6.1	Throughout (as required)	Where diversions or modifications are required to utility infrastructure, service interruptions and disturbance to the surrounding residential, commercial and/or community property may be unavoidable.

EIAR Chapter	Mitigation Number	EIAR Section Reference	Location	Description of Mitigation or Monitoring Measure / Environmental Commitment
				Where this is the case, it will be planned in by the appointed contractor in consultation with each utility provider, as relevant. Required service interruptions will generally only occur for a set period of time per day (a set number of hours not exceeding eight hours where reasonably practicable) and will generally not be continuous for full days at a time. Prior notification will be given to all impacted properties. This notification will include information on when interruptions and works are scheduled to occur and the duration of such interruption. Any required works will be carefully planned by the appointed contractor to ensure that the duration of interruption is minimised in so far as is practicable.
	MA5	18.6.2	Throughout (as required)	Consideration will be given to the sustainability of material being sourced for the construction of the Proposed Scheme by the appointed contractor. In so far as is reasonably practicable, materials required for the construction of the Proposed Scheme will be sourced locally to reduce the amount of travelling required to get the material to the site. Key issues to be considered when sourcing materials for the Construction Phase will include the source, the material specification, production and transport costs, and the availability of the material. Only quarries which are included in local authority quarry registers will be used by the appointed contractor to source any quarried material.
	MA6	18.6.2	Throughout (as required)	Construction materials will be managed on site by the appointed contractor in such a way as to prevent over-ordering and waste. Materials will be stored in appropriate storage areas or receptacles to reduce the potential for damage requiring replacement. “Just In Time” ordering principles will be implemented by the appointed contractor where practicable in order to reduce over-ordering.
Chapter 20 (Cumulative Impacts & Environmental Interactions)	CI&EI1	20.5.1	Throughout (as required)	Other infrastructure projects could directly interface with the construction of the Proposed Scheme. Interface liaison will take place on a case-by-case basis through GCC, as will be set out in the Construction Contract, to ensure that there is coordination between projects, that construction access locations remain unobstructed by the Proposed Scheme works and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.

2 Construction Traffic Management Plan

2.1 Introduction

The Construction Traffic Management Plan (hereafter referred to as the CTMP) has been prepared to demonstrate the manner in which the interface between the public and construction-related traffic will be managed and how vehicular movement will be controlled.

2.1.1 Purpose

The purpose of this CTMP is to demonstrate that the residual impacts to the public road network during the Construction Phase of the Proposed Scheme which have been identified in the application documentation can be minimised and that transport related activities are carried out as safely as possible and with the minimum disruption to other road users. The CTMP has also been prepared for the purpose of identifying feasible, appropriate and safe methods of access for construction traffic to the Proposed Scheme.

2.1.2 Objectives

The objectives of the CTMP are to:

- Outline minimum road safety measures to be undertaken, including site access / egress locations, during the works;
- Provide measures that respond to all road user needs including public transport, pedestrians, cyclists and vehicular traffic;
- Ensure disruption is minimised, with access to houses and businesses maintained as is reasonably practicable in delivering the Proposed Scheme;
- Demonstrate to GCC, the appointed contractor, and suppliers the need to adhere to the relevant guidance documentation for such works; and
- Identify objectives and measures for inclusion in the management, design and construction of the Proposed Scheme to control the traffic impacts of construction insofar as it may affect the environment, local residents and the public in the vicinity of the construction works.

2.1.3 Scope

This CTMP illustrates a traffic management design for the transportation of construction materials, equipment and personnel along the public road network to facilitate the construction of the Proposed Scheme. Light vehicles, such as cars and vans, are used by operatives travelling to and from the works areas. Lorries deliver general construction materials, such as concrete, to, from and around the works areas.

The appointed contractor will develop the CTMP in the event An Bord Pleanála decides to grant approval for the Proposed Scheme.

The CTMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by An Bord Pleanála.

The CTMP should be read in conjunction with Chapter 5 (Construction) of this EIAR.

2.2 Proposed Construction Activities

2.2.1 Overview

Construction activities to be carried out as part of the Proposed Scheme are illustrated in Chapter 5 (Construction) of this EIAR. Pavement operations are expected to be a key activity on the Proposed Scheme, and shall include planning, excavation, temporary stockpiling (if required), installing, disposal, import and haulage. The Construction Phase of the Proposed Scheme shall require movements of materials to, from and around the works areas. Most of the materials leaving the works areas will consist of road plannings.

Due to the dispersed nature of the scheme, it is anticipated that the construction works will be carried out at a minimum of three locations simultaneously at any given time. The scheme has therefore been split into three sections as detailed below and shown on Image 1:

- Section A – University Road to Eyre Square, Woodquay and Headford Road;
- Section B – Eyre Square, Forster Street, Dock Road, Bothar na Mban, Bothar Ui hEithir and Fairgreen Road
- Section C – College Road to Dublin Road.

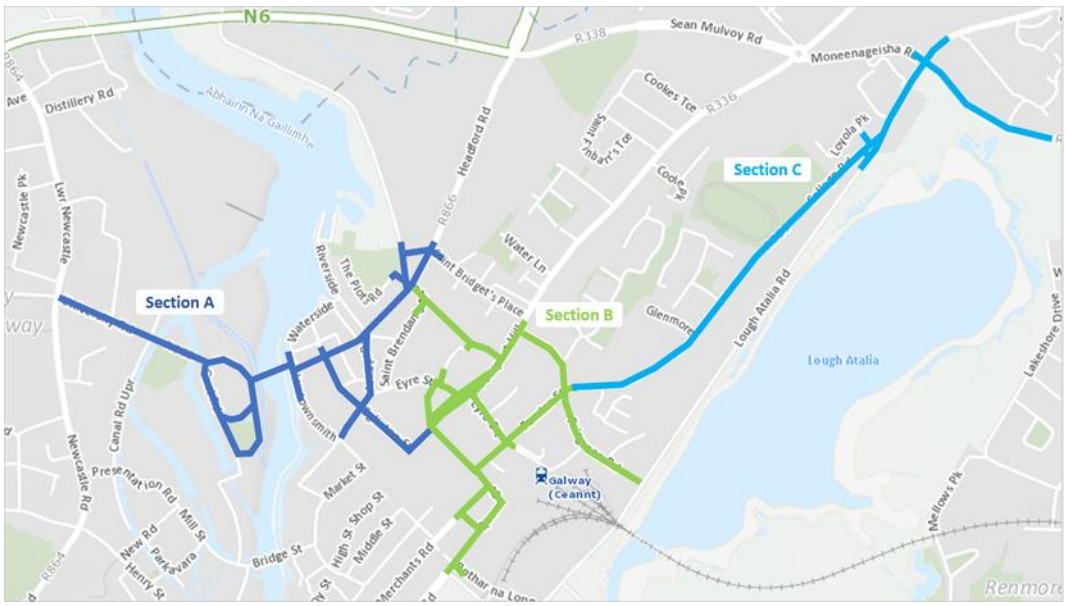

Image 1 Bus Connects Galway Cross-City Link

2.2.2 Construction Programme

A programme for the Proposed Scheme is provided in Section 5.4 in Chapter 5 (Construction) of this EIAR. The total Construction Phase duration for the overall Proposed Scheme is estimated at approximately 18 to 20 months. However, construction activities in individual sections will have shorter durations. The programme identifies the approximate duration of works at each section. The appointed contractor will be responsible for determining the final programme.

In order to achieve the overall programme duration, it will be necessary to work on more than one section / sub-section at any one time. The programme has been prepared with a view to providing as much separation as practicable between sections under construction at any given time. This has been done in order to minimise traffic disruption and facilitate the ease of movement of sustainable modes, bus services and goods along the Proposed Scheme.

The staging of construction and associated temporary traffic management measures has considered the receiving environment when developing the schedule of works.

2.2.3 Temporary Traffic Management Designs

In the event An Bord Pleanála decides to grant approval for the Proposed Scheme, Temporary Traffic Management designs (drawings and method statements) will be prepared by the appointed contractor in compliance with the Department of Transport's Traffic Signs Manual, Chapter 8, Temporary Traffic Measures and Signs for Roadworks (DTTS 2019a), hereafter referred to as the Traffic Signs Manual, to facilitate the safe and efficient construction of the Proposed Scheme.

Temporary construction traffic management provisions are provided in Section 5.8 in Chapter 5 (Construction) of this EIAR. These provisions have been developed using works areas for the purpose of safety, to minimise disruption and to facilitate the smooth operation of construction activities. The roads and streets along the Proposed Scheme, will remain open to general traffic wherever practicable during the Construction Phase, however lane closures, road closures and diversions will be necessary to facilitate construction. Traffic management provisions for each section / sub-section are included in Table 3.

Table 3: Traffic Management Provisions at each Section / Sub-Section

Section No.	Estimated Construction Duration	Traffic Management Provisions
Section A1	8 weeks	Phased lane closures as required. Close off the Canal Road Upper for 3 days
Section A2	16 weeks	Gaol Road converted into a two-way traffic route Gaol Road (east of the cathedral) will be closed to traffic.

Section No.	Estimated Construction Duration	Traffic Management Provisions
Section A3	4 weeks	Phased lane closures as required. Resurfacing of the bridge will require the closure of the bridge to vehicular traffic for a night.
Section A4	8 weeks	Closure of Waterside, between Courthouse Square and St. Vincent's Ave. Closure of Newtownsmith, between access to the river walk and St. Vincent's Ave.
Section A5	6 weeks	Phased lane closures as required.
Section A6	10 weeks	Closure of the road connecting Dyke Road to Headford Road adjacent to the Dyke Road carpark Phased lane closures as required.
Section A7	8 weeks	Phased lane closures as required.
Section A8	12 weeks	One lane of traffic in either direction will be maintained Phased lane closures as required.
Section B1	20 weeks	One lane of traffic in either direction will be maintained Phased lane closures as required.
Section B2	8 weeks	Phased lane closures as required.
Section B3	20 weeks	Phased lane closures as required. Works on Eyre Square North, with the existing access road closed to all traffic. Works on Rosemary Avenue and Eyre Street, with roads to be closed to vehicular access for the duration of the works.
Section B4	6 weeks	Phased lane closures as required. Overnight closure of Merchants Road (Forthill Street to Queen Street) and Queen Street to Dock Road, for the installation of raised tables.
Section B5	4 weeks	Phased lane closures as required.
Section B6	10 weeks	Phased lane closures as required. Overnight junction closure to facilitate surfacing works.
Section B7	4 weeks	Phased lane closures as required.
Section B8	3 weeks	Phased lane closures as required.
Section C1	6 weeks	Phased lane closures as required.

Section No.	Estimated Construction Duration	Traffic Management Provisions
Section C2	12 weeks	Existing traffic operation maintained.
Section C3	20 weeks	One lane of traffic in either direction will be maintained.
Section C4	10 weeks	One lane of traffic in either direction will be maintained Road surfacing - full junction closure over 2 -3 consecutive nights.
Section C5	16 weeks	Traffic reduced to three lanes on the Dublin Road and realigned in narrow lanes. One lane of traffic in either direction will be maintained.

2.2.4 Envisaged Construction Traffic Generation

Traffic will be generated during the Construction Phase of the Proposed Scheme. Construction traffic can be expected to comprise of trips for the following purposes:

- Journeys by construction personnel to and from the Proposed Scheme; and
- Delivery and removal of materials to and from the Proposed Scheme:
  - Clearance of existing material and waste;
  - Deliveries of construction material; and
  - Removal of construction waste material.

Construction activities associated with the Proposed Scheme typically follow a work sequence that is repeated in smaller works areas. The movement of construction vehicles to and from the Proposed Scheme is determined by this work sequence; materials either being ‘removed from’ or ‘delivered to’ site. There is also stationary dwell time as material is being unloaded or loaded at either end of a journey. Lorry movements for typical construction activity cycles are shown in Image 2 and Image 3.

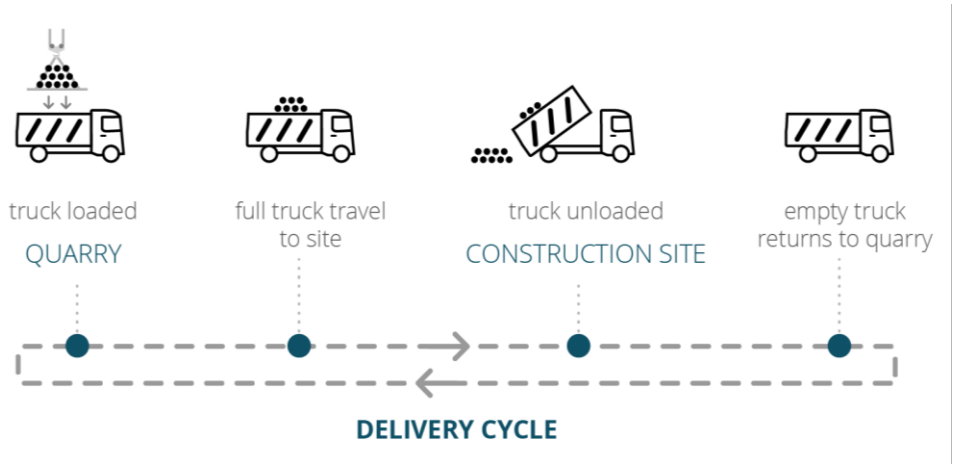

Image 2: Lorry Movements for 'Removal' of Materials

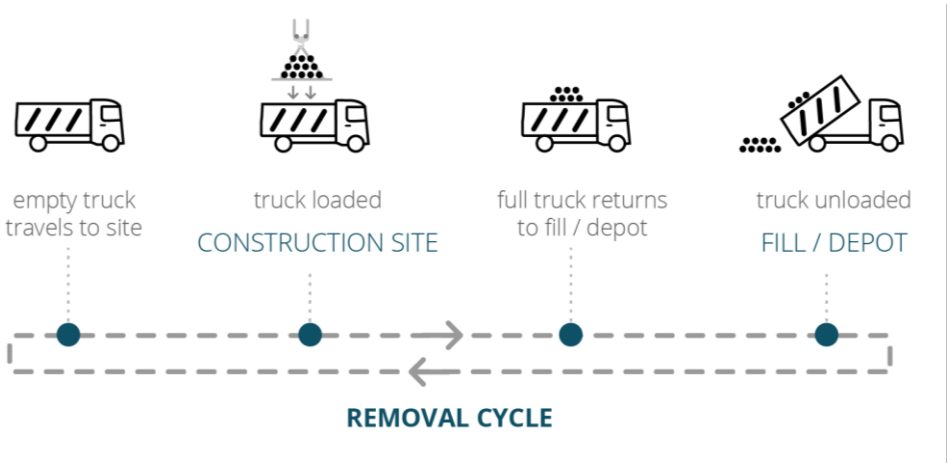

Image 3: Lorry Movements for 'Delivery' of Materials

Pavement operations are expected to be a key activity on the Proposed Scheme where this sequence will take place. This activity shall involve some or all of the following steps including planning, excavation, temporary stockpiling (if required), installing, disposal, import and haulage. Other activities such as traffic signal installation, signage and line marking, do not require lorry movements. Lorries are not always required to facilitate construction activities.

Likely traffic generation associated with construction site activities is described further in Section 2.2.4.1 and Section 2.2.4.2.

2.2.4.1 Removal and Delivery of Materials

An estimate of construction plant and equipment that will be necessary to construct the Proposed Scheme is provided in Section 5.6 in Chapter 5 (Construction) of this EIAR. Of the plant and equipment in operation during construction, lorries use the public road network for delivery and removal of materials to and from the Proposed Scheme.

Based on construction activities taking place, lorries are typically in operation 40% of the time.

This reflects the varied nature of works; whereby lorry movements are not necessary to execute certain construction activities and dwell time is experienced at either end of journeys. The number of lorries estimated to be in operation across the Proposed Scheme is shown in Table 4 for Section A1 to Section B7, and Table 5 for Section B8 to Section C5, as expanded on in Section 5.6 in Chapter 5 (Construction) of this EIAR.

Table 4: Estimated Peak Daily Lorry Numbers Across the Proposed Scheme (Section A1 to Section B7)

Plant / Equipment	**Section**														
Type	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7
Lorry	4	8	2	4	4	4	4	8	10	8	8	4	4	8	4

Table 5: Estimated Peak Daily Lorry Numbers Across the Proposed Scheme (Section B8 to Section C5)

Plant / Equipment	Section					
Type	B8	C1	C2	C3	C4	C5
Lorry	4	6	8	12	8	12

Lorry movements will be managed during the periods of 07:00 to 09:00 and 17:00 to 19:00 to minimise the impact of construction related traffic on peak-hour general traffic.

Construction vehicles will be directed to access work sections via the Proposed Scheme and dedicated routes on the National and Regional Road Network where practicable, to minimise use of the Local Road Network. The routes are outlined in Section 2.3.3 of this CTMP.

2.2.4.2 Journeys by Construction Personnel to and From the Proposed Scheme

Personnel numbers for the Proposed Scheme are illustrated in Section 5.10 in Chapter 5 (Construction) of this EIAR. Throughout the Construction Phase there will be some variation in the numbers of personnel working on site. It is anticipated there will be approximately 250 personnel directly employed across the Proposed Scheme, rising to 300 personnel at peak construction.

The appointed contractor will prepare a Construction Stage Mobility Management Plan (CSMMP) to actively discourage personnel from using private vehicles to travel to the Proposed Scheme. The CSMMP will promote the use of public transport, cycling and walking by personnel. Private parking at the Construction Compounds will be limited. Vehicle-sharing will be encouraged, subject to public health guidelines, where travel by private vehicle is a necessity e.g., for transporting heavy equipment.

Typical work hours are envisaged between 07:00 and 23:00 with personnel working across early and late shifts. The adopted shift patterns help minimise travel by personnel during the peak hour periods of 08:00 to 09:00 and 17:00 to 18:00.

A combination of CSMMP measures, as well as work shift patterns, means fewer than 10 trips by private vehicle are envisaged to and from site during peak periods.

2.3 Construction Traffic Management Plan Contents

The appointed contractor shall be responsible for developing a CTMP to effectively manage traffic and transport during the construction stage of the project. The appointed contractor shall address the following aspects, in addition to any other aspects identified by the appointed contractor during the preparation of the CTMP;

- Access and egress;

- Construction Compounds;
- Routing of construction vehicles;
- Pedestrian (including able-bodied pedestrians, wheel-chair users, mobility impaired pedestrians, pushchair users etc.) and cyclist provisions;
- Public transport provisions;
- Parking and access;
- Lighting;
- Construction Stage Mobility Management Plan (CSMMP);
- Traffic management signage;
- Timings of material deliveries;
- Traffic management speed limits;
- Vehicle cleaning;
- Road cleaning;
- Road condition;
- Road closures and diversions;
- Enforcement of Construction Traffic Management Plan;
- Interface with other projects;
- Emergency procedures during construction; and
- Communication.

Further details on issues to be addressed are provided in Section 2.3.1 to Section 2.3.19.

2.3.1 Access and Egress

The appointed contractor shall provide advanced warning signs, in accordance with the Traffic Signs Manual, on approach to the proposed access locations, entry and exit points throughout the live working area.

When roads and streets are being upgraded, there will be some temporary disruption / alterations to on-street and off-street parking provision, and access to premises in certain locations along the Proposed Scheme. Local arrangements will be made on a case-by-case basis to maintain continued access to homes and businesses affected by the works, at all times, where practicable. Details regarding temporary access provisions will be discussed with homes and businesses prior to construction starting in the area.

2.3.2 Construction Compounds

It is anticipated that three construction compounds will be utilised during the construction of the Cross-City Link, two main compounds located at Galway Harbour Enterprise Park, within Galway Docks and a satellite compound at Galway Cathedral Car-Park.

Construction Compound requirements to facilitate the Construction Phase of the Proposed Scheme are illustrated in Section 5.7 in Chapter 5 (Construction) of this EIAR.

The Construction Compound locations have been selected due to the amount of available space at this location, its location near the majority of the Proposed Scheme major works and its access to the National and Regional Road network.

The appointed contractor's CTMP shall include measures for managing traffic accessing and egressing the Construction Compounds. The Construction Compounds will contain a site office, and welfare facilities for GCC personnel and contractor personnel. Limited car parking will be allowed at the Construction Compounds, in line with the principles of the Construction Stage Mobility Management Plan (CSMMP). Materials such as topsoil, subsoil, concrete, rock etc., will be stored at the Construction Compounds for reuse as necessary. Items of plant and equipment will also be stored within the Construction Compounds.

2.3.3 Routing of Construction Vehicles

Access to and egress from the Construction Compounds is envisaged to be along dedicated construction vehicle routes. It is assumed that all national roads and regional roads in the immediate vicinity of the Proposed Scheme would be used by construction vehicles.

The following national roads are expected to be used as construction vehicle access routes during the Construction Phase of the Proposed Scheme:

- N3, Navan Road; and
- M50 Motorway.

The following regional roads are expected to be used as construction vehicle access routes during the Construction Phase of the Proposed Scheme:

- R147;
- R804; and
- R805.

Assumed construction vehicle access routes for the Proposed Scheme are shown in Image 4.

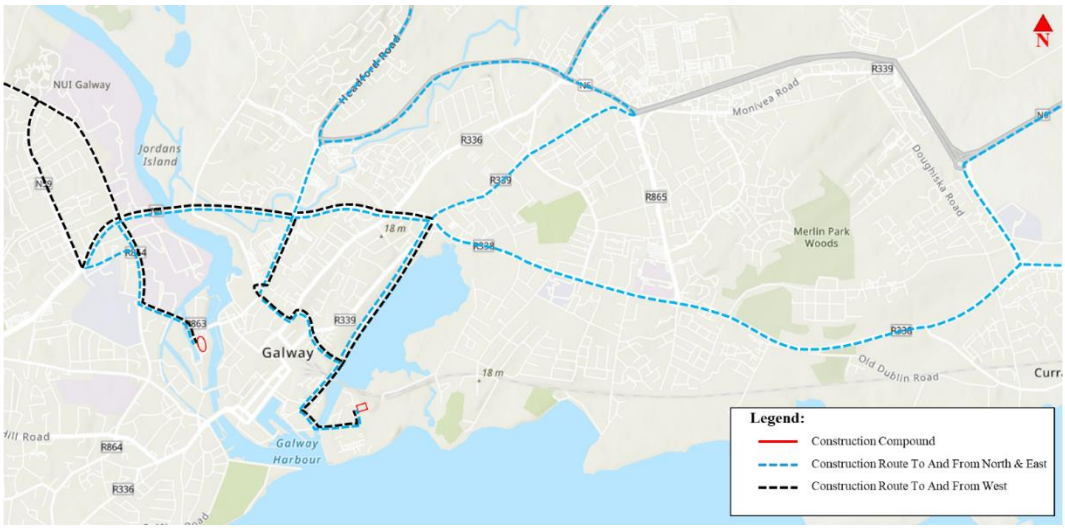

Image 4: Construction Vehicle Access Routes

2.3.4 Pedestrian and Cyclist Provisions

The measures set out in Section 8.2.8 of the Traffic Signs Manual will be implemented, wherever practicable, to ensure the safety of all road users, in particular pedestrians (including able-bodied pedestrians, wheel-chair users, mobility impaired pedestrians, pushchair users) and cyclists. Therefore, where footpaths or cycle tracks are affected by construction, a safe route will be provided past the work area, and where practicable, provisions for matching existing facilities for pedestrians and cyclists will be made.

2.3.5 Public Transport Provisions

Existing public transport routes will be maintained throughout the duration of the Construction Phase of the Proposed Scheme (notwithstanding potential for occasional road closures / diversions as discussed in Section 2.3.15). Wherever practicable, bus services will be prioritised over general traffic. However, the temporary closure of sections of existing dedicated bus lanes will be required to facilitate the construction of new bus priority infrastructure that is being developed as part of the Proposed Scheme. Some existing bus stop locations will need to be temporarily relocated to accommodate the works. In such cases, bus stops will be safely accessible to all users and all temporary impacts on bus services will be determined in consultation with GCC and the service providers.

2.3.6 Parking and Access

When roads and streets are being upgraded, there will be some temporary disruption / alterations to on-street and off-street parking provision, and access to premises in certain locations along the Proposed Scheme. Local arrangements will be made on a case-by-case basis to maintain continued access to homes and businesses affected by the works, at all times, where practicable. Details regarding temporary access provisions will be discussed with homes and businesses prior to construction starting in the area. The duration of the works will vary from property to property, but access and egress will be maintained at all times.

2.3.7 Lighting

The majority of the Proposed Scheme is already artificially lit, however temporary lighting will be required at times along the Proposed Scheme at certain locations during the Construction Phase, where necessary. Where it is necessary to disconnect public lighting during the construction works or to undertake works outside of daylight hours where the existing lighting is low, appropriate temporary lighting will be provided. Temporary lighting will also be installed at the Construction Compounds for the duration of the Construction Phase.

The standard of temporary lighting installed during the Construction Phase will meet the standard of the existing carriageway and will be appropriate to the speed and volume of traffic during construction. Temporary construction lighting will generally be provided by tower mounted floodlights, which will be cowled and angled downwards to minimise spillage of light from the site.

2.3.8 Construction Stage Mobility Management Plan (CSMMP)

The appointed contractor will prepare a CSMMP. The CSMMP will be used to encourage personnel to commute by means other than private car. The CSMMP may comprise the following topics, as well as other relevant topics identified by the appointed contractor:

- Introduction;
- Objectives and targets;
- Strategy of travel;
- Construction phase specific measures;
- Access and surrounding road network;
- Opportunities for car sharing;
- Implementation and co-ordination;
- Monitoring; and
- Adherence to public health guidelines.

2.3.9 Traffic Management Signage

Temporary traffic management signage will be put in place in accordance with the requirements of the Department of Transport's Traffic Signs Manual, Chapter 8, Temporary Traffic Measures and Signs for Roadworks (DTTS 2019a) to warn road users of the works ahead and to advise of any changes to the carriageway layout. In addition to temporary traffic management signage, requirements may include;

- Provision of temporary signage indicating access route and locations for the appointed contractor and associated suppliers; and
- Provision of general information signage to inform road users and local communities of the nature and locations of the works, including contact details.

2.3.10 Timings of Material Deliveries

The appointed contractor will seek to reduce the impact of material deliveries on local communities and residents adjacent to the Proposed Scheme during the Construction Phase, where practicable.

2.3.11 Traffic Management Speed Limits

Adherence to posted / legal speed limits will be emphasised to all personnel / suppliers by the appointed contractor during induction training. The use of special speed limits for construction traffic in sensitive areas will be considered, such as 30km/hr at school locations. Recommended speed limits would only apply to construction traffic and not to general traffic. The sign posting of such speed limits is not expected in the interest of clarity for local road users.

2.3.12 Vehicle Cleaning

Details and information on vehicle cleaning to be carried out during the Construction Phase of the Proposed Scheme is provided in Section 4.3.12.

2.3.13 Road Cleaning

Roads being used for dedicated construction vehicle access routes shall be regularly inspected for cleanliness.

The appointed contractor will monitor for mud and debris on the roads as a result of the Construction Phase works and use a road sweeping vehicle for cleanliness if needed. The use of road cleaning sweepers should be considered as a last resort with prevention being the main objective.

2.3.14 Road Condition

The extent of the lorry traffic movements and the nature of the payload may create problems of:

- Fugitive losses from wheels, trailers, or tailgates; and
- Localised areas of subgrade and wearing surface failure.

Activities which may reduce the impact on road condition are outlined below. They should be incorporated into the CTMP by the appointed contractor where practicable;

- Loads of materials leaving each works area will be evaluated and covered if considered necessary to minimise potential dust impacts during transportation;
- Take all reasonable measures while transporting waste or any other materials likely to cause fugitive losses from a vehicle during transportation to and from the works areas, including but not limited to;
  - Covering of all waste or material with suitably secured tarpaulin / covers to prevent loss; and
  - Utilisation of enclosed units to prevent loss.
- Undertake pavement condition surveys along roads forming part of the construction traffic route, based on consultation with GCC and professional judgement regarding the condition of the route pre-construction. These record the baseline structural condition of the road being surveyed immediately prior to construction; and
- Throughout the course of construction of the Proposed Scheme, undertake on-going visual inspections and monitoring of the construction traffic routes to ensure any damage caused by construction traffic is recorded. Arrangements can then be made to repair any such damage to an appropriate standard in a timely manner such that any disruption is minimised.

Upon completion of construction of the Proposed Scheme, the surveys carried out pre-construction shall be repeated, and a comparison of the pre-construction and post-construction surveys carried out.

2.3.15 Road Closures and Diversions

Road closures and diversions will need to be carried out during the Construction Phase of the Proposed Scheme; however, these measures will be minimised wherever possible. Where necessary, road closures and diversions will take into consideration the impact on road users, residents, businesses etc. Road closures and diversions will be carried out with regard to the Traffic Signs Manual. All road closures and diversions will be determined by GCC, in consultation with the local authority and An Garda Siochána, as necessary.

Access will be maintained for emergency vehicles along the Proposed Scheme, throughout the Construction Phase.

2.3.16 Enforcement of Construction Traffic Management Plan

The appointed contractor shall develop the CTMP for use throughout the Construction Phase. All personnel and material suppliers shall be required to adhere to the CTMP. The appointed contractor shall agree and implement monitoring measures to confirm the effectiveness of the CTMP and compliance shall be monitored by GCC. Regular inspections / spot checks shall be carried out to ensure that all personnel and material supplies follow the agreed measures adopted in the CTMP.

2.3.17 Interface with Other Projects

The likely timelines of the Proposed Scheme construction works have considered the potential for simultaneous construction of, and cumulative impacts with other infrastructure projects and developments which are proposed along, or in the vicinity, of the Proposed Scheme. The likely significant cumulative impacts caused by the Proposed Scheme in combination with other existing or planned projects are identified and assessed in Chapter 20 (Cumulative Impacts & Environmental Interactions) of this EIAR.

Interface liaison will take place on a case-by-case basis through GCC, as will be set out in the Construction Contract, to ensure that there is coordination between projects, that construction access locations remain unobstructed by the Proposed Scheme works and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.

2.3.18 Emergency Procedures During Construction

The appointed contractor shall ensure that unobstructed access is provided to all emergency vehicles along all routes and accesses. GCC shall provide to the local authorities and emergency services, contact details of the appointed contractor personnel responsible for construction traffic management.

In the case of a construction traffic related emergency, the following procedure shall be followed:

- Emergency Services will be contacted immediately by dialling 112;

- Exact details of the emergency / incident will be given by the caller to the emergency line operator to allow them to assess the situation and respond in an adequate manner;
- The emergency will then be reported to the appointed contractor;
- All construction traffic shall be notified of the incident (where such occurs off site);
- Where required, appointed first aiders will attend the emergency immediately; and
- The appointed contractor will ensure that the emergency services are directed to and arrive at the emergency location.

2.3.19 Communication

The appointed contractor shall, through GCC, ensure that close communication with the relevant local authorities and the emergency services shall be maintained throughout the Construction Phase.

As discussed in Section 1.6, the appointed contractor shall, through GCC, also ensure that the local community, landowners, and strategic stakeholders are appropriately informed of proposed traffic management measures in advance of their implementation. Contact information for key points of contact will be provided for members of the public to obtain additional information and to provide additional knowledge such as local events, sports fixtures etc. which may conflict with proposed traffic management measures. The appointed contractor will liaise with landowners through the Communication Plan agreed with GCC, where access to their property is temporarily affected by works.

3 Invasive Species Management Plan

3.1 Introduction

This Invasive Species Management Plan (hereafter referred to as the ISMP) for the Proposed Scheme contains management recommendations in respect of preventing the spread of and managing a range of non-native invasive species along the Proposed Scheme. Invasive Species (IS), Invasive Alien Species (IAS) or Invasive Alien Plant Species (IAPS) are terms sometimes referenced in legislation and or guidance. They are referred to as non-native invasive species in this report but are interchangeable.

The ISMP describes the options available to manage and prevent the spread of Third Schedule, non-native invasive plant species identified in the vicinity of the Proposed Scheme. Only non-native invasive species listed on the Third Schedule of the Birds and Natural Habitats Regulations 2011 - S.I. No. 477 of 2011 (hereafter referred to as the Birds and Natural Habitats Regulations) are dealt with in this ISMP.

The ISMP will be developed prior to the commencement of any on-site works for the Proposed Scheme. Construction works can disturb stands of Third Schedule non-native invasive plants and / or soils contaminated with non-native invasive plant material, as well as potentially lead to a new infestation. Therefore, management measures which will be contained in the ISMP will be implemented to avoid any direct or indirect impacts to habitats and species contained within the locality or as a result of its introduction to the area.

3.1.1 Legislative Context

The Birds and Natural Habitats Regulations contain specific provisions that govern control of listed invasive species. It is an offence to release or allow to disperse or escape, to breed, propagate, import, transport, sell or advertise species listed on Schedule 3 of the Birds and Natural Habitats Regulations without a Licence. The two regulations that deal specifically with this scheduled list of species are:

- Regulation 49: Prohibition of introduction and dispersal of certain species;
- and
- Regulation 50: Prohibition on dealing in and keeping certain species.

Following on from that the following are strictly prohibited:

- Dumping invasive species cuttings in anywhere other than in facilities licensed to accept them;
- Planting or otherwise causing to grow in the wild, hence the landowner (in respect of the Proposed Scheme this being GCC and the appointed contractor) should be careful not to cause further spread);
- Disposing of invasive species at a landfill site without first informing the landfill site (that is licensed under the Waste Act to take such Third Schedule material - plant or soil) that the waste contains invasive species material (this action requires an appropriate licence);
- Moving soil which contains Third Schedule-specific non-native invasive species in the Republic of Ireland, unless under licence from the National Parks and Wildlife Service (NPWS) (this licence is separate from and does not discharge any person being in receipt of other necessary waste permits / licences etc.); and
- European Parliament and of the Council (Invasive Alien Species) Regulation 2014 (1143 of 2014) (hereafter referred to as the IAS Regulation) lists specific Species of Union Concern, some of which overlap with the Third Schedule species.

The IAS Regulation conveys the rules to prevent, minimise and mitigate the adverse impacts of the introduction and spread (both with and without intention) of invasive alien species on biodiversity and the related ecosystem services, as well as other adverse impacts on human health or the economy.

Target 4.4 of Ireland's third National Biodiversity Action Plan 2017-2021 (Department of Culture, Heritage and the Gaeltacht 2017) requires that "harmful invasive alien species are controlled and there is reduced risk of introduction and / or spread of new species".

3.1.2 Limitations

It should be noted that any decision on efficacy of chemical treatments can only be provided by registered pesticides advisor. A suitably qualified specialist will be appointed by the contractor to monitor the treatment of non-native invasive species. This ISMP shall be updated as necessary by the specialist.

3.2 Methodology

3.2.1 Guidance

This ISMP and the mitigation strategies that are discussed relating to invasive plant species have been prepared with regard to the following guidance documents, where relevant:

- The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (Transport Infrastructure Ireland (TII) 2020a)
- The Management of Invasive Alien Plant Species on National Roads – Standard (TII 2020b)
- Managing Japanese knotweed on Development Sites (Version 3, amended in 2013, withdrawn from online publication in 2016): The Knotweed Code of Practice (Environment Agency (EA) 2013) (This document, although no longer supported by the EA, is nonetheless a practical document in determining the approach and control mechanisms for Japanese knotweed);
- Managing Invasive Non-Native Plants in or near Freshwater (EA 2010);
- Best Practice Management Guidelines for Japanese knotweed (Invasive Species Ireland (ISS) 2008a);
- Best Practice Management Guidelines for Himalayan balsam (ISS 2008b);
- Best Practice Management Guidelines for Giant hogweed (ISS 2008c);
- *Allium triquetrum* (Three-cornered garlic) Great Britain Non-Native Organism (Non-Native Species Secretariat (NNSS) 2018);
- Countryside Management Publications, Giant hogweed (Department of Agriculture and Rural Development (Northern Ireland) (2016);
- Good Practice management, New Zealand pygmyweed (*Crassula helmsii*) Version 1, August 2018 (Animal and Plant Health Agency et al. 2018);
- Management Measures for Widely Spread Species (WSS) in Northern Ireland Nuttall's waterweed (*Elodea nutallii*) (Northern Ireland Environment Agency 2021);
- Aquatic and Riparian Plant Management: Controls for Vegetation in Watercourses, Technical Guide (EA 2014); and
- Biosecurity Protocol for Field Survey Work (Inland Fisheries Ireland 2010).

3.2.2 Surveys

Following on from a desk study review of the National Biodiversity Data Centre (NBDC) records, non-native invasive species surveys were undertaken for the Proposed Scheme in 2019, 2020, 2021 and 2022 within the appropriate botanical season (April to September) when species are readily observable and identifiable.

Non-native invasive species listed on the Third Schedule of the Birds and Natural Habitats Regulations were searched for within and adjacent to the Proposed Scheme. Surveys were carried out by the EIAR ecologists, however, non-native invasive species were not detected along the Proposed Scheme, however Japanese Knotweed was detected approximately 32m from the site boundary at the Galway Harbour Enterprise Park. Full details of the surveys are included in Chapter 12 (Biodiversity) in Volume 2 of this EIAR.

3.3 General Measures to Control and Prevent the Spread of Non-Native Invasive Plant Species

3.3.1 Pre-Construction Survey

During the interim between the original non-native invasive species surveys and commencement of construction following grant of planning permission, it is possible that the existing stands of Third Schedule non-native invasive species may have expanded (if unmanaged) or decreased (if active management regime in place), or that newly established Third Schedule non-native Invasive species may have become established within the footprint of the Proposed Scheme.

A confirmatory pre-construction invasive species survey will be undertaken by a suitably qualified specialist, arranged by GCC, to confirm the absence, presence and / or extent of all Third Schedule non-native invasive species within the footprint of the Proposed Scheme. Where an infestation is confirmed / identified within the footprint of the Proposed Scheme, this will require the implementation of the ISMP.

Data collected as part of the pre-construction invasive species survey will include a detailed description of the infestation including the approximate area of the respective colonies (m^2), where feasible, approximate total number of stems, pattern of growth and information on other vegetation present). This information will enable calculations of volumes of infested soils to be excavated where necessary, as part of the measures outlined below.

Following on from the pre-construction invasive species survey, the ISMP will be updated, as advised by a suitably qualified specialist, with regard to the Management of Invasive Alien Plant Species on National Roads - Technical Guidance (TII 2020a) and Standard (TII 2020b) and other species-specific guidance documents including those listed in the ISMP, as necessary. The updated ISMP will detail the strategy that will be adopted during the Construction (and Operational) Phase in order to manage and prevent the spread of invasive plant species, and where a Third Schedule non-native invasive species are encountered directly in the works area, the method of treatment / eradication.

3.3.2 Invasive Species Management Plan (ISMP)

Following on from the pre-construction invasive species survey, the ISMP will be updated to detail the exact measures for any non-native invasive species population present within the footprint of the Proposed Scheme. Depending on the extent and nature of the works, a number of approaches / treatments may be approved, all following on from the measures in the ISMP.

GCC will ensure that all control measures specified in the ISMP shall be implemented by a suitably qualified and licenced specialist prior to the Construction Phase of the Proposed Scheme to control the spread of newly established non-native invasive species within the footprint of the Proposed Scheme.

Furthermore, the appointed contractor will adhere to control measures specified within the ISMP throughout the Construction Phase of the Proposed Scheme. The site will be monitored by the appointed contractor after control measures have been implemented. Any re-growth will be subsequently treated.

All measures that are prescribed in the ISMP shall be equally applicable to advance works as to construction works. In the operational phase the management of the infrastructure will be the responsibility of the local authority and the control of invasive species will be as per their plans and procedures, and responsibilities under The Birds and Natural Habitats Regulations.

3.3.3 General Measures to Avoid the Spread of Non-Native Invasive Species

The unintentional spread of non-native invasive species during construction works (within a construction site or unwittingly from outside of a site, such as through the importation of materials or poor biosecurity practices regarding plant and machinery) can be a significant issue, and if not managed properly, can result in the spread of non-native invasive species to uninfested areas (within or adjacent to works areas), which would increase the future cost and effort required to control the species and could pose further public health and safety risks (Japanese knotweed can cause damage to weaknesses in built environment, whilst Giant hogweed is an environmental public health hazard).

The most common ways that invasive species can be spread is:

- Site and vegetation clearance, mowing, hedge-cutting or other landscaping activities;
- Spread of seeds or plant fragments during the movement or transport of soil;
- Spread of seeds or plant fragments through the local surface water and drainage network;
- Contamination of vehicles or equipment with seeds or plant fragments which are then transported to other areas;
- Importation of soil from off-site sources contaminated with invasive species plant material; and
- Leaving riparian corridors bare of vegetation thus allowing establishment of seed material from outside the site.

3.3.3.1 Site Establishment

During advance works and prior to commencement of construction, any areas where Third Schedule non-native invasive species have been recorded by the pre-construction surveys must be clearly fenced off prior to and during construction (in order to avoid spreading seeds or plant fragments around or off the construction site) until such time that the mitigation measures are implemented and treatment has been completed, or that works in these areas are monitored in accordance with the requirements of the ISMP.

This includes the Construction Compounds and the entirety of the Proposed Scheme footprint. Earthworks or machinery movement must be avoided in any areas where non-native invasive species have been identified during the pre-construction surveys, until the relevant stands have been eradicated.

3.3.3.2 Biosecurity and Site Hygiene

It is important to ensure that the spread of non-native invasive species, where present, is curtailed. It is also necessary to ensure that in areas where non-native invasive species are not present, that they are not unintentionally spread e.g., through the importation of contaminated material being brought onto the site.

Unwashed construction equipment, plant, vehicles, and footwear can provide a vector for the spread of non-native invasive species within the Proposed Scheme and from areas outside the Proposed Scheme, where infestation is present or where vector material potentially containing seed / root material is attached to plant. The following hygiene measures shall be undertaken for the Proposed Scheme.

- Known or potentially infested areas within the working area of the Proposed Scheme shall be clearly fenced off in advance of works and access restricted until such time that treatment has commenced and / or construction works are monitored in accordance with the ISMP in the area. In relation to Japanese knotweed, the guidance recommends an exclusion buffer of 7m (metres) in all directions (within the works area and 3m vertically underground);
- Erection of clear signage at the Construction Compounds etc. and inclusion of detail during tool-box talks or similar (environmental induction) for construction staff in respect of the management of Third Schedule non-native invasive species. The signage and notification should be easily understood so that users are aware of the measures to be taken for known non-native invasive species, or what they should do in the case of suspected non-native invasive species identified. In particular the potential health risks posed by Giant hogweed, where it is recorded from within or adjacent to a Proposed Scheme should be clearly notified to personnel;
- Identify dedicated access points into and out of fenced off areas. These shall not be breached until such time that eradication / removal of non-native invasive species is confirmed or monitoring of the treatment / eradication process is commenced;

- Where possible, the locations of dedicated footwear and wheel wash facilities should be identified in the ISMP. Where a dedicated / bespoke wheel wash cannot be installed owing to space limitations, the appointed contractor will ensure that no excavated loose material is allowed offsite from within an exclusion zone. Similarly, where plant that is used to excavate soils, it shall be visually checked for loose soil before movement to another part of site (where possible, the movements of tracked machinery should be restricted within the non-native invasive species exclusion zone. Loose soil shall be scraped off and disposed of, and a solution of Virkon© (or similar approved disinfectant) applied to machinery to ensure that no obscured seed / root material remains viable;
- Vehicular movements within the exclusion area shall be minimised as far as is practical;
- Machinery which has been used for the transport and / or excavation of infected / suspected infected vector material shall be thoroughly washed down, and the washings captured for disposal. All such machinery / plant shall not be permitted to commence work elsewhere on or off-site until written confirmation of same has been undertaken;
- Dedicated wash down and solution capture should be set up in the Construction Compounds.

  All washings should be stored in a quarantined bunded container that is rated for such storage until such time that they are removed offsite for disposal and a facility that is authorised to accept such waste;
- Except in very particular circumstances, under the guidance of the specialist, there shall be no temporary storage of infected / suspected infected soils on-site. They must be removed offsite as per guidance in Section 3.3.3.2; and
- Where small volumes e.g., volume capable of being double bagged in quarantine bags such as cut plants, bulbs or loose soil occur, it may be practical to bag the material and bring it to a clearly demarcated and dedicated quarantine area within the Construction Compounds until such time that the material is disposed of to an authorised facility, similar to the process of disposing of bulk excavated infected soil.

3.3.3.3 Soil Excavation

No excavations within a clearly demarcated and fenced off buffer zone shall be permitted. For Japanese knotweed, guidance recommends a horizontal distance of up to 7m from the outside of the stand. This could include under built ground, should suitable areas of weakness or uncompacted ground be encountered by the plants' rhizomes. For other species there will be different buffer zones as guided by the specialist.

Where the excavation of soil containing Third Schedule non-native invasive species (vector material) is the preferred option, the operation shall be monitored for its entirety until the risk of spread of Third Schedule non-native invasive species is negated.

There should be no temporary storage on-site of bulk excavated infected material. Where the ISMP calls for shallow / deep burial, this material shall be removed from the excavated area and transported immediately to approved receptor area on site. Furthermore, the temporary storage of uninfected material should not occur within a European or National site nor within 10m of any watercourse and any land within an identified flood zone. Where temporary stockpiles of infected material cannot for practical limitations, be situated away from a potential flood risk area, the appointed contractor will be required to include a flood response plan within the Environmental Incident Response Plan (see Section 6) to ensure that any inundation of Construction Compounds does not result in a pollution event to nearby water bodies.

Plant and machinery used in the control, excavation and transport of invasive material shall also be subject to the recommendations described in Section 3.4.3.2.

The installation of industry-rated non-native invasive species-proof membrane before infilling construction of road / paths surface may be required. All waste arising out of this process which has been in contact with the excavated ground shall be treated as infected waste and disposed of at a facility that is authorised to accept such waste (See Section 3.3.3.4).

Where the movement of any Third Schedule non-native invasive species is required off-site, a licence will be required from NPWS in advance of any movement to a site/facility licensed to accept such waste, as per the Birds and Natural Habitats Regulation. This licence is separate to; and does not negate the need for licences / permits / authorisations required under waste legislation.

3.3.3.4 Disposal of Material

Where any non-native invasive plant material is collected (e.g., by hand-pulling or mowing), it is important that its disposal does not result in a risk of further spread. The movement of invasive plant material, offsite, requires a licence from the NPWS, as per the Birds and Natural Habitats Regulations. Invasive species (particularly roots, flower heads or seeds) must be disposed of at licensed waste facilities or composting sites, appropriately buried, or incinerated having regard to relevant legislation, e.g., Waste Management Act 1996, as amended – S.I. No. 10 of 1996 (hereafter referred to as the Waste Management Act); Section 4 of the Air Pollution Act 1987 – No. 6 of 1987; relevant local authority byelaws and any other relevant legislation. All disposals must be carried out in accordance with the relevant waste management legislation, as per guidance from the Transport Infrastructure Ireland (TII) Guidelines for the Management of Waste from National Road Construction Projects (TII 2017).

It should be noted that some invasive species plant material or soil (vector material) containing residual herbicides may be classified as either ‘hazardous waste’ or ‘non-hazardous waste’ under the terms of the Waste Management Act, and both categories may require special disposal procedures or permissions. Advice should be sought from a suitably qualified waste expert regarding the classification of waste and the suitability of different disposal measures.

3.3.3.5 Measures to be Implemented during the Application of Herbicides

Some of the control options may require the use of herbicides, which can pose a risk to human health, to non-target plants or to wildlife. In order to ensure the safety of herbicide applicators and of other public users of the site, a suitably qualified pesticides advisor, registered with the DAFM must be employed.

The appointed contractor is required to refer to appropriate guidance documents, including but not limited to those listed in Section 3.2.1, which provide detailed recommendations for the control of invasive species and noxious weeds.

These documents include measures to aid the identification of relevant species, with details for the timing, chemicals and methodology for chemical control (if applicable), and for measures to avoid environmental damage during the use of herbicides. The appointed contractor (or the specialist as appropriate) will update the ISMP in accordance with the relevant guidelines before commencing works.

It should be noted that where a chemical treatment is to be used, there is a risk of contaminating a watercourse. The choice of herbicide is typically limited to formulations of Glyphosate or 2,4-D amine that are approved for use near water.

Full details of any chemical used, where required and as advised by a registered pesticides advisor, will be included in the ISMP prepared in advance of construction of the Proposed Scheme.

3.3.3.6 Importation of Soil and Other Material

The bulk importation of material from offsite could potentially result in the accidental spread of Third Schedule non-native invasive species, as it is uncertain if these site(s) are free from non-native invasive species. This is likely to be less of an issue for road building material. However, in terms of landscaping, if soil is imported to the site for landscaping, infilling or embankments, the appointed contractor shall seek documentation from suppliers confirming that the material is free from invasive species.

3.3.3.7 Post-Construction Monitoring

Following the construction of the Proposed Scheme, there may be ongoing treatment programmes which extend for a number of years into the Operational Phase. In the operational phase the management of the infrastructure will be the responsibility of the local authority and the control of invasive species will be as per their plans and procedures, and responsibilities under The Birds and Natural Habitats Regulations.

The above measures are important for all Third Schedule non-native invasive species, and in particular Japanese knotweed, where it occurs, as maintenance works associated with landscaping, such as mowing and hedge cutting have the potential to spread this plant via the dispersal of very small amounts of shredded plant material. If invasive plants are found, then they shall be treated as per the measures outlined in the ISMP and any species-specific guidelines.

3.4 Assessment of Management Options for Third Schedule Non-Native Invasive Species

The general measures included in Section 3.4 are required to ensure good on-site practices in respect of known or potential Third Schedule non-native invasive species.

Sections 3.4.1 to Section 3.4.5 further identify practical management controls. The colour scheme shown is a qualitative tool intended to assist the reader to focus on the most likely practical solutions. It is acknowledged that more than one potential control measure exists and that a single or combination of measures may be required. The recommendations presented in this ISMP provide the minimum requirements for the likely control measures and the measures outlined in this ISMP shall be developed (with further detail on methodology used at each location, timing, practical management etc.) by the appointed contractor (or the specialist as appropriate).

The use of chemical treatments is recognised as a potential treatment option. However, the services of a registered pesticide advisor must be employed in the specifying named chemicals including those rated for use adjacent to aquatic environments where required, treatment type, dosage, and timing etc., and / or use of pesticides in the management of potential Third Schedule non-native invasive species within the Proposed Scheme.

The selected management control to be defined for each non-native invasive species stand within the Proposed Scheme will depend on:

- Results of the pre-construction survey; and,
- Construction requirements – timing of works at specific locations, level of infestation and practical considerations such as reducing disturbance to road users / homeowners.

The ISMP, which will be updated following on from the pre-construction surveys, may require the utilisation of a number of controls that are described and assessed below.

3.4.1 Japanese knotweed (*Reynoutria japonica*)

Japanese knotweed is high impact non-native invasive species that is particularly effective at colonising disturbed ground (e.g., construction sites) and can spread by the re-growth of cut fragments or root material, so if it is broken up during site clearance or other earthworks it can readily re-grow in new areas to which soil is moved. Japanese knotweed readily reproduces asexually (in Ireland, at least, as only Female plants have been recorded) and regrowth can occur from plant material weighing as little as 0.7g (grams) of viable material. It is acknowledged to be very difficult to effectively control and an even more difficult weed to fully eradicate.

Given the nature of Japanese knotweed, chemical treatments are often preferred over physical methods as they can, if implemented properly reduce the disturbance of the plant / population thus reducing the chances of its spread. If herbicide is applied as the treatment option, it will need to be reapplied for up to five years after the first application to ensure the plant control measures have been effective; or monitored for a minimum of two years during which no regrowth is recorded.

Table 6 presents an assessment of potential treatment options available for the treatment of Japanese knotweed. The various methods are analysed and described in further detail as necessary. It should be noted that where it might occur within a Proposed Scheme, that a number of the measures described below may be applicable, depending on the nature of works, the timing etc. These will be fully detailed in the ISMP after the recommended pre-construction survey of the Proposed Scheme.

Table 6: Assessment of Management Methods for Japanese knotweed

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Scheme
Physical	Dig and dispose offsite, under license	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorized to accept it. In addition to waste permits / authorizations, a wildlife license issued by NPWS is required for the transport of Third Schedule non-native invasive species offsite. Depending on the nature of the excavation the proximity of services etc., the use of root barrier membrane (Section 3.1.1) could be required.	Likely – given the nature of the schemes, there may be a need to excavate soil and plant material to enable construction works to go ahead in timely manner.
	Dig and dispose onsite. - Shallow burial - Deep burial	A wildlife license from NPWS is not ordinarily required if the burial of collected material is proposed for within the consented development site. Shallow burial in a constructed cell such as a dedicated sealed cell within a constructed berm will allow for periodic monitoring and of easy chemical treatment of any regrowth. Deep burial entails a dedicated sealed cell within a constructed excavation, that is at least 2m below the surface of the ground. The landscaping regime should not specify trees or scrub to be planted above.	Unlikely – given the lack of suitable lands within the largely developed metropolitan area.

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Scheme
		Either shallow or deep option could require the use of root barrier membrane (Section 3.4.1.1). The use of chemical pre-treatment of deep/shallow cells could also be required.	
	Screen on site – remove fragments offsite & reuse soil.	A control option that can be used to reduce the volume of soil / sediment to be moved elsewhere for burial, this option requires suitable plant, adequate space and volumes of soil to make the operation at a location cost effective. This option often requires the use of root barrier membrane (Section 3.4.1.1) owing to reuse of screened soil. The use of chemical pre-treatment of deep / shallow cells could also be required.	Possible but unlikely given the space requirements for a screener (unless a bespoke small-scale screener is available).
	Cutting and / or Strimming	Not recommended and does not apparently diminish vigour of plants over time. Largely cosmetic and can result in considerable spread of viable vegetative material that can readily regenerate on suitable conditions.	Not Recommended.
Chemical	Spot	Used for isolated plants – knapsack or weep sprayers. Chemical treatments for infestations near water should be rated for use near aquatic locations.	Chemical treatments are often a preferred option for treating Japanese knotweed, but the process can take between 3 to 5 years before eradication can be guaranteed and requires at least 2-year post implementation monitoring. However, given the nature of the Proposed Scheme, the use of chemical treatment alone is unlikely to be adequate unless treatment regime begins a number of years before construction commencement.
	Spray	Used for isolated plants or large populations using knapsack or weep sprayers. In accessible areas including along riverbanks, lance sprayers can be used. Chemical treatments for infestations near water should be rated for use at or near aquatic locations. Can result in chemical drift.	
	Stem Injection	This method is considered very effective, if the injection is timed appropriately for growth phase. However, it is labour-intensive (sometimes) requiring some cutting and is usually only carried out on small/isolated populations. Chemical treatments for infestations near water should be	Possible and requires specialist equipment to enable working alongside the biohazardous plant. Some advantages over other conventional chemical treatments e.g., reduces drift, not weather dependent.

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Scheme
		rated for use at or near aquatic locations.	

3.4.1.1 Root Barrier Membrane

Following on from the excavation of Japanese knotweed, there may be a need to install a root barrier membrane. These are specialised products that can provide protection to structures / services etc. from regrowth from within or outside a site if suitably rated and properly installed. Thereafter, any small adjacent infestation can be more readily treated with chemical treatment for example.

3.4.1.2 Reseeding Following Eradication

This is not strictly a control method. However, where treated ground is not being built upon, planting or resowing mixtures of native grass species helps to restore the original vegetation and aids post control management of affected sites. A grass sward established in autumn will compete with germinating Japanese knotweed seedlings in the following spring.

3.4.2 Giant hogweed (Heracleum mantegazzianum)

This is a high-risk invasive species, that is also a biohazard in that it can pose a threat to humans. The chemistry of its sap is such that exposure to it on skin can result in prolonged photosensitizing reactions with blistering. Thus, a clearly demarcated exclusion buffer, in excess of 4m, is recommend for any individual / populations of this species before commencing works.

It spreads via heavy seeds which can easily be transported by water; hence it is often found along river corridors. While the plant favours riverbanks, it is known to be found on waste / derelict ground as well as railway lines for instance. Its presence can impact local biodiversity and undermine bankside integrity. The seedling stage is the most vulnerable. Mortality of seedlings is comparable to many other plants and its seed bank is considered to be persistent for a short number of years only. Since Giant hogweed can only reproduce via seed, control measures applied before flowering and fruit set will limit subsequent generations (and even then, only with favourable conditions). The ideal time to control Giant hogweed via chemical treatment is April, with follow on monthly applications targeting regrowth, although for this treatment options, it can require up to five years before successful eradication.

Table 7 presents an assessment of potential treatment options available for the treatment of Giant hogweed. The various methods are analysed and described in further detail as necessary.

Table 7: Assessment of Management Methods for Giant hogweed

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Scheme
Physical	Above ground Cutting	Not recommended. Largely cosmetic and prolongs flowering until such time that control halted. However, if digging is used, it is recommended that the removal be attempted in April /early May when the plant is usually less than 30cm tall. However, the root must be captured also.	Unlikely - requires specialist equipment to enable working alongside the biohazardous plant
	Root cutting	Individual plants may be killed by cutting at a 45-degree angle 15cm below ground level with a spade in April or May. Can be laborious unless small/isolated stands. Can be effective if combined with chemical treatment over four to five years repeat treatment	Given the nature of the project, could be used to remove biohazard plant and thereafter allow for chemical control against any regrowth. Requires specialist equipment to enable working alongside the biohazardous plant
	Strimming	Not recommended owing to spread of sap.	Not Recommended.
	Ploughing	Can provide total control where seedlings and young plants encroach onto agricultural land. However not practical in metropolitan areas and isolated stand along riverbanks.	Unlikely given the locations that Giant hogweed is often found in.
	Grazing	Grazing should begin when early foliage appears in April and should continue until early autumn when re-sprouting stops. Eradication can take between 5-10 years so that seed bank and root stock is fully depleted of resources.	Not possible in metropolitan area
	Pulling	Hand pulling is only suitable for small/immature plants (and with suitable PPE to protect exposure of bare skin). Potential remains for tap root to remain underground and regenerate.	Unlikely for mature plants. Requires specialist equipment to enable working alongside the biohazardous small/immature plants
	Biological Control	Other than natural soil biota, it is not currently permitted to introduce any organisms to areas to deal with Giant hogweed. Research ongoing which would require permitting thereafter.	Not possible at present.

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Scheme
	Dig and dispose offsite, under license	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorized to accept it. Given the phytotoxic nature of the plant, it should not be buried onsite nor disposed of with general C&D waste. In addition to waste permits / authorisations, a wildlife license issued by NPWS is required for the transport of Third Schedule non-native invasive species offsite.	Possible and depending on location may be required.
Chemical	Spot Treatment	Used for isolated plants – knapsack or weep sprayers. Chemical treatments for infestations near water should be rated for use near aquatic locations.	Most widely used method, but to be wholly effective, requires total control over ~5 years of treatments within a river catchment or the isolated location. Is weather dependent and can result in chemical drift to adjacent vegetation or watercourses.
	Spray	More suitable for large stands, where machine-mounted blanket sprays are used. Chemical treatments for infestations near water should be rated for use near aquatic locations.	Possible but unlikely owing to nature and size of population recorded on scheme.
	Stem Injection	Can only be carried out on young stems. Due to difficulties with the timing of application and the potential safety risk of contact with the large leaves this method requires specialist safety equipment.	Possible and requires specialist equipment to enable working alongside the biohazardous plant – Despite some advantages over other conventional chemical treatments e.g., reduces drift, not weather dependent.

3.4.2.1 Temporary Storage of Collected Material

Given the phytotoxic nature of Giant hogweed, cut material should not be discarded. Ideally it should be disposed of immediately with similar non-native invasive species waste to a facility authorised to accept such waste.

However, given the nature and relative sizes of Giant hogweed infestations it may be suitable to collect cut biomass (where not disposed of immediately to a facility authorised to accept such waste), and to double bag it for transport to dedicated quarantine area (location to be approved as part of the ISMP to decompose before disposal with similar non-native invasive species waste in a facility authorised to accept such waste.

The locations of areas for which Giant hogweed has been eradicated should be notified to the local authority, so that any future public health issue involving similar symptoms can be tracked.

3.4.2.2 Reseeding Following Eradication

This is not strictly a control method. However, where treated ground is not being built upon, planting or resowing mixtures of native grass species helps to restore the original vegetation and aids post control management of affected sites. A grass sward established in autumn will compete with germinating Giant hogweed seedlings in the following spring and retard its establishment.

3.4.3 Himalayan balsam (Impatiens glandulifera)

This high-risk invasive species is easily disturbed, particularly if in flower and readily becomes re-established along riparian corridors, which are annually subject to alluvial flooding. Unlike Japanese knotweed though, it does not reproduce asexually. Plants can produce in excess of 6000 seeds, and it aggressively colonises bare ground along riverbanks - including wet woodlands as well as waste ground where suitable conditions exist. Due to its rapid growth, it can outcompete most native species. While its seedbanks are viable for up to 18 months, the resupply of seed is often achieved through annual river flooding and riparian inundation with freshly deposited soil-laden alluvium.

Table 8 presents an assessment of potential treatment options available for the treatment of Himalayan balsam. The various methods are analysed and described in further detail as necessary. Control measures for Himalayan balsam should aim to prevent flowering and are therefore undertaken before June. However, eradication may take up to five years. It should be noted that successful localised management of Himalayan balsam is difficult along watercourses, as the spread of this non-native invasive species from upstream areas (e.g., outside of the Proposed Scheme) onto bare ground often occurs after winter flooding.

Table 8: Assessment of Management Methods for Himalayan balsam

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Scheme
Physical	Hand Pull	Small isolated and immature infestations, such as in gardens or roadsides can usually be readily pulled prior to flowering e.g., care must be taken not to leave lower plant sections as these can regrow rapidly. Additionally, any flower heads (if present) should be covered by a	Possible – ideal for smaller areas adjacent to the likely works boundary.

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Scheme
		tied bag before pulling to ensure no seed drop.	
	Dig and dispose offsite, under license	This option requires that all plant material (above and below ground) is excavated along with soil and disposed of to a facility authorised to accept it. In addition to waste permits / authorisations, a wildlife license issued by NPWS is required for the transport of Third Schedule non-native invasive species offsite.	Possible – given the nature of the scheme, this may be an optimal control measure.
	Mechanical	Repeated cutting or mowing, is effective for larger stands, but plants can regrow if the lower parts (above lowest node) are left intact. Regeneration can be further halted by ensuring full ground vegetative layer through reseeding.	Possible but unlikely main option given the nature of works along existing road infrastructure.
	Grazing	Regular grazing is said to suppress the plant over time.	Not practical – given the nature of the metropolitan landscape and nature of the scheme.
Chemical	Spot/Weed Wiper	Can be used for smaller infestations in spring before flowering occurs, but as late as to allow germinating seedlings to have become established and thus be able to uptake the chemical treatment. adjacent to the likely works boundary – chemical treatments for infestations near water should be rated for use near aquatic locations.	Possible – within the works boundary – Where ground is to be excavated, may require physical control also.
	Foliar Spray	Can be applied to larger infestations via knapsack spray / lance spray etc. in spring before flowering occurs, but as late as to allow germinating seedlings to have become established and thus be able to uptake the chemical treatment. Chemical treatments for infestations near water should be rated for use near aquatic locations.	Possible – within the works boundary – Where ground is to be excavated, may require physical control also.

3.4.3.1 Temporary Storage of Collected Material

Given the nature and relative extent of Himalayan balsam infestations in some urban situations, collected biomass (pulled stems / roots and bagged flower heads), where not disposed of immediately to a facility authorised to accept such waste, could be double bagged and put in dedicated quarantine areas (locations to be approved as part of the ISMP).

Here, the material could be left to decompose before disposal with similar non-native invasive species waste at an authorised facility.

3.4.3.2 Reseeding Following Eradication

Areas devoid of; or cleared of vegetative cover near watercourses should be resown with appropriate riparian ground cover species in summer months to ensure that bare banks do not provide favourable conditions for Himalayan balsam to become re-established and to protect banks from accelerated erosion.

For any area of ground that is cleared of this non-native invasive species, and which is not subsequently constructed upon, follow-on mechanical cutting regimes and / or chemical treatments may be required to ensure the seed bank is fully exhausted.

3.4.4 Three-cornered garlic (*Allium triquetrum*)

A medium impact, rhizomatous species, Three-cornered garlic is often planted and can become established in natural and semi natural habitats, where it is reported to spread by ant-dispersed seed and division of clumps (NNSS 2018).

It can readily establish in suitable ground resulting in it posing a threat to biodiversity where the plant forms early season dense monocultural masses, particularly at protected sites.

Management of this species is relatively straightforward, although there is a requirement that it be visible above ground so as to delineate its likely extent and ensure efficacy of management. Management of infestations can be managed through chemical or physical-based options or a combination of both. However, given the possibility of some underground bulbs / seedbank remaining within the ground post-treatment, eradication may require a number of repeat treatments over a number of years to ensure effective treatment of all bulbs.

Table 9 presents an assessment of potential treatment options available for the treatment of Three-cornered garlic. The various methods are analysed and described in further detail, as necessary.

Table 9: Assessment of Management Methods for Three-cornered garlic

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Scheme
Physical	Hand dig	Hand-dig when small population present, ensuring that all biomass including bulbs collected. May also require a number of years of mechanical cutting to exhaust seed/bulb bank in wider subsurface environment. In addition to waste permits / authorisations, a wildlife license issued by NPWS is required for	Likely

		the transport of Third Schedule non-native invasive species offsite.	
	Mechanical Excavation	For larger areas of infestation only, soil can be screened, and bulbs removed. In addition to waste permits / authorisations, a wildlife license issued by NPWS is required for the transport of Third Schedule non-native invasive species offsite.	Unlikely given the nature and size of the identified populations.
Chemical	Spray	Chemical treatment can be made in the spring (when above ground vegetation visible) but before flowering. Multiple applications may be required due to persistence of bulbs and soil seed bank.	Possible - Where ground is to be excavated, may require physical control also

3.4.4.1 Temporary Storage of Collected Material

Given the nature and relative sizes of infestations of Three-cornered garlic, bulbs and vegetative material, where not disposed of immediately to authorised facilities, could be double bagged and placed in dedicated quarantine areas to decompose before disposal with similar non-native invasive species waste at authorised facilities.

3.4.4.2 Reseeding Following Eradication

For any area of ground that is cleared of Three-cornered garlic, and is not constructed upon, a follow-on mechanical hand-pulling / cutting regime and / or chemical treatment may be required post construction to ensure full exhaustion of the bulb / seed bank.

3.4.5 New Zealand pigmyweed (*Crassula helmsii*)

The trade and potential escape of New Zealand pigmyweed through the aquarium and garden industry is considered the principal vector for the introduction of this species into new locations, particularly discarded material. Once established, it can readily spread resulting in a threat to native biodiversity, where the plant can form monocultural masses. It does not reproduce from seed, but readily grows from small stem fragments (~5mm in length). It does not like shaded areas and where present can thrive in open, slow-moving waters and ponds. It responds well to nutrient enrichment, particularly nitrate enhancement.

Three forms of the plant are recognised, namely submerged, emergent, and terrestrial, with emergent and terrestrial forms easily identified. It is considered to be extremely difficult and costly to control, particularly where large monodominant stands occur, and its ability to form new plants vegetatively from small fragments facilitates its spread to new locations. Management of infestations may be managed through a range of measures, although it is recognised that it is very difficult to fully eradicate unless a catchment- based approach is taken.

It is also noted that physical / chemical management is avoided in late summer and autumn.

Table 10 presents an assessment of potential treatment options available for the treatment of New Zealand pigmyweed.

Table 10: Assessment of Management Methods for New Zealand pigmyweed

Approach	Treatment Options Potential Actions	Comment	Potential for Implementation on the Proposed Scheme
Physical	Dredging	Dredging of material including soils (between October to March) followed by offsite composting or incineration. Up and downstream areas would need to be fully enclosed with fine net to captures released material. In addition to waste permits / authorisations, a wildlife license issued by NPWS is required for the transport of Third Schedule non-native invasive species and contaminated soil offsite.	Possible but unlikely. Onerous to undertake and efficacy is considered low unless strictly applied, as it could result in further spread.
	Burying	Drying out the waterbody followed by burial (February to March) in excess of 20cm (centimetres) of collected dredged material.	Considered successful, when combined with chemical treatment but usually applied to ponds etc. Not possible if canal navigation to be retained and other species of note e.g., *Groenlandia densa* potentially present.
	Hand pulling	Up and downstream areas would need to be fully enclosed with fine net to capture released material. Collected material (All year – if plant is visible) could be composted offsite or sent for incineration.	Only suitable for areas that can be contained e.g., water flow unhindered despite area being netted. Submerged material may be overlooked.

Approach	Treatment Options Potential Actions	Comment	Potential for Implementation on the Proposed Scheme
		In addition to waste permits / authorisations, a wildlife license issued by NPWS is required for the transport of Third Schedule non-native invasive species and contaminated soil offsite.	
	Covering site	Cover with black polythene or a similar material to shade the plant for at least three months, but preferably six. Has been demonstrated to work for other submerged species e.g., Lagarosiphon, but untested for Crassula.	Unlikely - given the nature of Crassula, treatment likely for small discrete infestation only. Would be very onerous to cover submerged infested area with jute/polythene to shade outgrowth for 3 months plus. Could locally alter the area to detriment of native biodiversity. Does not confirm that dormant submerged material would not become established after removal of covering.
	Saltwater inundation	Flood affected areas with saltwater for a minimum of 31 days.	Only suitable for areas near the sea and where saline water can be prevented from flowing off. Not suitable in freshwater systems, where other native species would not tolerate saline conditions.
Chemical	Knapsack sprayer	Chemical treatment can be made in the April to November. Multiple applications within a season are not usually required if applied at the appropriate time and no further physical disturbance of the treated population occurs.	Possible, but only captures emergent and terrestrial forms. Emergent form where present would remain untreated.

Approach	Treatment Options Potential Actions	Comment	Potential for Implementation on the Proposed Scheme
		Chemical treatments for infestations should be rated for use near aquatic locations.	
Environmental		Steepening banks, increasing the shading of the area and introducing fast growing, native species have all been shown to be effective in certain situations, particularly when used in conjunction with other methods above.	Unlikely given the nature of the project

Other options for which unconfirmed data is available or licensed to release biological controls are not yet approved and have been discounted from assessment as potential control methods. They include - grazing by introduced Grass carp (a non-native fish species), the release of Gall forming mites (currently at EU approval stage); hot foam and hot water and drying out the ground.

Although this species was not found present within the footprint of the Proposed Scheme during surveys, measures for addressing this species are covered within this ISMP on a precautionary approach, as it is known in the wider area and in the event that it becomes established within the Proposed Scheme area between the surveys taking place and construction commencing.

A pre-construction survey will be required in advance of works. Given that the presence of submerged vegetation is difficult to note and can be overlooked if dormant, the ISMP will detail the measures that are applicable for all works affecting water bodies. The key element for the Proposed Scheme will be the avoidance as far as practical of unnecessary disturbance of water body edge and sediments. Thereafter, standard environmental measures will be applied. This will include rigorous application of biosecurity measures for all plant / equipment brought onto or near waterbodies and again before moving to another area. No instream works will be permitted where this species is found present unless specific precautions and control measures have been clearly identified and implemented, to reduce for potential disturbance of riparian vegetation (where it occurs).

3.4.5.1 Temporary Storage of Collected Material

If this non-native invasive species is found present, all material, where not disposed of immediately to authorised facilities, will be double bagged and placed in dedicated quarantine areas (away from watercourses) to decompose before disposal with similar non-native invasive species waste at authorised facilities.

3.4.6 Canadian Pondweed (*Elodea canadensis*) & Nuttall's pondweed (*Elodea nuttallii*)

Both species are regarded as perennials, overwintering in the deeper water, and reproducing asexually. Disturbance increases the dispersal of a considerable number of propagules and the vigorous re-growth is enhanced through changes in availability of nutrients. In Ireland although both are ranked as a medium risk plant, they are both ranked as highly invasive. Both species has a wide ecological tolerance and can grow relatively fast, resulting in displacement of native flora. The plant can form dense mats which outcompete native plant species and therefore decrease the biodiversity in an area, as well as interfering with navigation and recreational activities on watercourses.

Although, not considered as widespread as Canadian pondweed, Nuttall's pondweed is nonetheless spreading, and in the UK and Ireland is regarded as now displacing the former, possibly due to increased eutrophication. Nuttall's pondweed is also more tolerant of poorer water quality, disturbance, and poorly implemented management such as navigation clearance.

Both share many of the same attributes and are usually found in deeper water, rooted in sediment these pondweeds can be free floating in water column if disturbed.

Table 11 presents an assessment of potential treatment options available for the treatment of both pondweeds.

Table 11: Assessment of Management Methods for Canadian Pondweed (Elodea canadensis) & Nuttall's pondweed (Elodea nuttallii)

Approach	Treatment Options	Comment	Potential for Implementation on the Proposed Scheme
Physical	Draw down	Some studies indicate success where water levels can be dropped and sediments dried out, that this can be effective	Not likely, given the nature of the Proposed Scheme and the likely occurrence of this species further up the canal which could result in later reestablishment.
	Cutting	By hand or on specially adapted barges. Best undertaken before July, Repeat harvesting can result in nutrient depletion (if source of eutrophication into watercourse controlled). This is a longer-term solution that would require careful implementation to ensure no unnecessary spread of material.	This is long-term solution would require commitment from GCC and other stakeholders to undertake.
	Covering site	Cover with Jute or a similar material to shade the plant. Has been demonstrated to work for other submerged species e.g., Lagarosiphon,	Possible but unlikely - given the nature of Elodea, and its potential distribution elsewhere could be onerous in terms of project timeframes and difficult

		and a DCC sponsored project on the use of jute matting undertaken on parts of the River Liffey between Islandbridge and Chapelizod.	to cover submerged infested area with jute to shade-out growth. Would not guarantee prevention of re-establishment and would require pollution sources to be addressed to reduce eutrophication.
Environmental	Water dyes	Both species can tolerate some shade of deeper water, but water dyes have been found to be effective in static waters. Additional landscape planting to increase shade are considered to be effective.	Not likely given the location of the canal in highly populated area, unless a well-developed PR campaign is put in place to explain. Potential for landscape planting is also limited by virtue of location and space requirements.
Chemical	There is currently no herbicide product approved for treatment of submerged macrophytes such as Elodea spp.		

Other options for which unconfirmed data is available or licensed to release biological controls are not yet approved and have been discounted from assessment as potential control methods. They include biological control through the introduction of grass carp (a non-native fish) and other bottom feeders.

Although these species were not found present within the footprint of the Proposed Scheme during surveys, measures for addressing these species are covered within this ISMP on a precautionary approach, as they are known in the wider area and in the event they become established within the Proposed Scheme area between the surveys taking place and construction commencing. A pre-construction survey shortly in advance of works will be required. Given that the presence of submerged vegetation is difficult to note and can be overlooked if dormant, the ISMP will detail the measures that are applicable for the duration of works at waterbody crossings. The key element for the Proposed Scheme will be the avoidance as far as practical of unnecessary disturbance of water body edge and sediments. Thereafter, standard environmental measures will be applied. This will include rigorous application of biosecurity measures for all plant/equipment brought onto or near the water-feature and again before moving to another area.

No instream works will be permitted where these species are found present unless specific precautions and control measures have been clearly identified and implemented, to reduce for potential disturbance of riparian vegetation (where it occurs).

3.4.6.1 Temporary Storage of Collected Material

If these non-native invasive species are encountered, all material, where not disposed of immediately to authorised facilities, will be double bagged and placed in dedicated quarantine areas (away from watercourses) to decompose before disposal with similar non-native invasive species waste at authorised facilities.

4 Surface Water Management Plan

4.1 Introduction

This Surface Water Management Plan (hereafter referred to as the SWMP) for the Proposed Scheme details the control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase.

The control and management measures are best practice approaches that can be used to protect surface water during the Construction Phase of the Proposed Scheme.

4.1.1 Objectives

The objectives of the SWMP are to:

- Ensure sediment and pollution control requirements can be built into the design stage and land requirements for the Proposed Scheme as far as practicable;
- Minimise and where possible, avoid potential for sediment, silty water, and other contaminants such as oil, fuel, concrete, cement, and other materials to discharge to a watercourse;
- Minimise the area and duration of exposed ground which has the potential to create runoff; and
- Minimise any potential impacts in the event of an accidental spillage or site runoff by providing appropriate control and containment measures on site and by maintaining sediment and pollution controls throughout the Construction Phase of the Proposed Scheme.

4.1.2 Legislation and Guidance

The SWMP and the control and management measures relating to surface water management have been prepared with regard to the following guidance documents, where relevant:

- Bathing Water Quality Regulations 2008 (S.I. 79 of 2008),
- EC Environmental Objectives (Groundwater) Regulations 2009 (S.I. 9 of 2010 and SI 366 2016),
- EC Environmental Objectives (Surface Waters) Regulations (S.I. 272 of 2009),
- EU Water Framework Directive (WFD) 2000/60/EC,
- European Communities (Marine Strategy Framework) Regulations 2011 (S.I. 249 of 2011),
- European Communities (Quality of Salmonid Waters) Regulations 1998 (S.I. 293 of 1998),
- European Communities (Water Policy) Regulations 2003-2005 (S.I. 722 of 2003),
- Groundwater Directive (2006/118/EC),

- Local Government (Water Pollution) Acts 1977 – 1990, and
- S.I. No. 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010,
- Urban Wastewater Treatment (UWWT) Regulations (S.I. 254 of 2001) as amended.

Control and mitigation measures have been identified with reference to the following guidelines:

- CIRIA (Murnane et al.), 2006. C648 Control of Water Pollution from Linear Construction Projects: Technical Guide (CIRIA 2006a),
- CIRIA (Murnane et al.), 2006. C649 Control of Water Pollution from Linear Construction Projects: Site Guide (CIRIA 2006b),
- CIRIA, 2005. Environmental Good Practice on Site (C650); Construction Industry Research and Information Association (CIRIA 2005),
- Construction Industry Research and Information Association (CIRIA), 2001. C532 Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (CIRIA 2001),
- Enterprise Ireland, 2003. Best Practice Guidelines BPGCS005 – Oil Storage Guidelines (Enterprise Ireland 2003),
- Inland Fisheries Board (IFB), 2016. Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFB 2016),
- National Roads Authority (NRA), 2006. Guidelines for the Crossing of Watercourses during the Construction of National Road schemes (NRA 2006),
- S.I. No. 41 of 1999 Protection of Groundwater Regulations, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive),
- Safety, Health and Welfare at Work (Construction) Regulations 2013,
- The Planning System and Flood Risk Management - Guidelines for Planning Authorities (DEHLG and OPW, 2009),
- TII, 2015. Road Drainage and the Water Environment DN-DNG-03065) (TII 2015b), and
- Transport Infrastructure Ireland (TII), 2015. Design Manual for Roads and Bridges Part 3 DN-DNG-03022 (NRA HD 33/15) (Including Amendment No. 1) (TII 2015a).

4.2 Existing Environment

The project site is a highly urbanised part of Galway City. The main surface water receptors in the project area are:

- River Corrib,
- Distillery River,
- Friar's River, and
- Lough Atalia.

Distillery River and Friar's River are parts of the Corrib River system.

The site is in the Corrib River catchment within WFD Catchments 29 (Galway Bay South East) and 30 (Corrib). The River Water Quality Status of the River Corrib (CORRIB_020) for the 2013-2018 monitoring period was 'Good'. The Transitional Waterbody WFD status (2013-2018) of Lough Atalia (and the River Corrib estuary waterbody) was also 'Good'.

There are approximately 17 no. existing outfall locations: 11 no. outfalls to water bodies, 5no. outfalls to the wastewater treatment plans and 1 outfall to the wastewater treatment plans and to the water bodies as shown in Table 12. No new outfall locations are proposed, other than upgrading the existing ones and providing attenuation where road widening takes place.

Table 12: Surface Water Outfall Locations

No.	Catchment	Existing Network Type	Existing Outfalls
1	University Road/Canal Road Upper	Combined Sewer	Mutton Island Wastewater Treatment Plant.
2	Gaol Road/University Road	Combined Sewer	Mutton Island Wastewater Treatment Plant.
3	Gaol Road	Surface Water	Distillery River.
4	University Road/Salmon Weir Bridge	Surface water	Distillery River.
5	Saint Vincent Avenue/Walsh's Terrace/Wood Quay/St Francis Street/ Eglinton Street	Combined Sewer	Mutton Island Wastewater Treatment Plant.
6	St Vincent's Avenue	Surface Water	Friar's River.
7	Dyke Road	Surface Water	River Corrib.
8	Williamsgate Street	Surface Water and Combined Sewer	Island Wastewater Treatment Plant.
9	Merchant's Road and Forthill Street/ Victoria Place, Eyre Square and Forster Street	Surface Water and Combined Sewer	Mutton Island Wastewater Treatment Plant.
10	College Road (Fairgreen Road)	Surface Water	Lough Atalia
11	Loyola Park	Surface water	Lough Atalia
12	Lough Atalia Road/Petrol Station	Combined sewer	Mutton Island Wastewater Treatment Plan
13	College Road (Loyola Park)	Surface Water	Lough Atalia
14	College Road /Dublin Road	Surface Water	Lough Atalia
15	Dublin Road	Surface Water	Lough Atalia
16	Dublin Road	Surface Water	Lough Atalia
17	Dublin Road	Surface Water	Lough Atalia

4.3 Proposed Control Measures

The design of the surface water drainage system has considered the potential impacts to the receiving environment and has embedded mitigation measures in the design. The following sections outline additional preventive measures that ensure impacts are mitigated to acceptable level. The Appointed Contractor shall develop a more elaborate SWMP.

GCC will appoint an ECoW to monitor the implementation of mitigation measures outlined in the plan.

The key surface water impacts because of the proposed project may include:

- Increased sediment discharge to receiving waters,
- Increased risk of flooding,
- Increased risk of accidental chemical and fuel spills, and

The proposals contained in this SWMP are required to mitigate against these impacts.

The Proposed Scheme generally maintains the existing road profile so that the existing drainage system remains mostly unchanged. In areas where widening takes place, flows from the extra impermeable surface area will be attenuated before discharging to existing drainage system.

The Proposed Scheme is largely in Flood Zone C, except for sections in Gaol Road, Victoria Place, and Lough Atalia Road at its junction to Dublin Road which is in either Flood Zone A or B. The Harbour Site Compound is located in Flood Zone C.

In areas where the risk of flooding is significant, i.e., Flood Zone A or B, the following actions shall be taken:

- Remove/dispose surplus material from site immediately,
- Avoid direct discharge (i.e., without attenuation) of surface water to the nearby watercourse,
- Avoid obstructing runoff pathways,
- Contact the OPW for surface water flooding related issues.

4.3.1 Groundwater Vulnerability

The bedrock aquifer beneath half the project site (southwest) is poor aquifer (which is unproductive except for local zones) and regionally important aquifer – (Karstified conduit) in the remaining half (northeast). According to the GSI website (accessed in March 2022), the project site's groundwater vulnerability is moderate to high, which indicates a general overburden depth of < 5m. There may be a significant requirement for groundwater dewatering due to the site's proximity to the Corrib River and Lough Atalia. All construction dewatering water shall be stored for removal off site for treatment and disposal if this applies.

4.3.2 River and Stream Crossings

The Proposed Scheme crosses the River Corrib system at three locations. The following best practice guidelines shall be adhered to at these crossing locations:

- Prior to construction commencing at these sites, the Appointed Contractor will ensure that all construction equipment is in good working order and that they do not need refuelling or maintenance,
- Fuels, chemicals, and other fluids will be handled with care to avoid accidental spills,
- Fuelling and maintenance shall not take place within 20m distance of these water courses,

- All spillages will be contained and removed from site immediately,
- Any accidental spills will be notified to the ECoW immediately.

4.3.3 Sediment Control Plan (SCP)

The Appointed Contractor shall develop a Sediment Control Plan (SCP) before construction commences. The Contractor will monitor the suspended solids and turbidity levels to ensure sediment concentrations are appropriate prior to discharge. The SCP shall, as a minimum, contain information on items discussed in the following sub-sections.

4.3.4 Construction Sequencing – Installation of Drainage Features

To protect water bodies from potential impacts, such as increased volumes of run-off, silty water and accidental spills, temporary drainage control measures will be installed at the outset, prior to any site clearance works. This will include measures such as construction of silt fences erected and set up of settlement tanks.

4.3.5 Silty Water Runoff

- Clearing and stripping of topsoil or existing roads and footpaths exposing underlying granular layers at each phase of works will be delayed as long as possible, being carried out shortly before construction begins,
- Silt fences will be installed / erected along the boundary of the Construction Compound and around surface water drains or watercourses to prevent any silt laden runoff from impermeable surfaces, and
- Weather conditions will be considered by the Appointed Contractor when planning construction activities to minimise the risk of silty water runoff from the site.

4.3.6 Retaining wall and Upgraded footpath parallel to Dublin Road

There is potential for significant sediment generation associated with the widening of the existing footpath running at the south side of Dublin Road very close to Lough Atalia. The following measures are recommended to minimise sediment runoff:

- Retaining Wall:
  - The concrete for the foundations will be poured in dry weather only,
  - Silt fences will be used along the top of the bank to reduce the likelihood of silty water runoff and cement washings reaching the canal, and
  - Any water collected behind the silt fences will be settled using a silt-buster tank (or similar) and then discharged to the foul sewer (with the permission from Galway City Council). It has the potential to have high pH from the concrete and so will not be discharged to the Lough Atelia.

- Footpath widening:
  - The concrete for the mass concrete gravity wall will be poured in dry weather only,
  - a sediment trap shall be located immediately downstream of the works to prevent silt discharging into Lough Atalia,
  - Soil stripping shall be undertaken under dry weather conditions,
  - Stockpiling soil and aggregate shall be at appropriate location with adequate setback,
  - Heavy vehicular movement shall be restricted and kept away as far as possible.

4.3.7 Upgraded of outfall at Lough Atalia

An existing 150mmØ pipe discharging to Lough Atalia, south of Lough Atalia Road is proposed to be upgraded to a 225mm outfall. The construction of the pipe will be carried out only from landside. The outfall will be hidden behind rock armour. There is potential for significant impacts associated with works related to trench excavation, bedding and haunching and surround filling. These will be avoided and minimised through best practice measures.

The Appointed Contractor is responsible for contacting the Environmental Protection Agency (EPA) and IFI to ensure these measures are in line with the requirements these agencies. Method Statements for the upgrade of the outfalls shall be agreed with IFI prior to construction.

4.3.8 Stockpiling Material

- The following measures will be implemented during stockpiling:
- Clearing and stripping of topsoil or existing roads and footpaths exposing underlying granular layers at each phase of works will be delayed as long as possible, being carried out shortly before construction begins rather than stripping the whole site many months before construction,
- Where an excavation contains a combination of acceptable and non-acceptable material for re-use the excavation will be conducted so that the acceptable material is excavated and stockpiled separately without contamination by the unacceptable material,
- Temporary stockpiles will be located away from surface water drains or watercourses at a minimum distance of 10m,
- The topsoil, and upper level of subsoil, will be stripped and stockpiled in identified locations,
- For watercourse crossings, stockpiles will not be located anywhere within the crossing working area,
- No stockpiles will be located within a European or National Site or within a floodplain area,
- Management of stockpiles to prevent siltation of watercourse systems through runoff during rainstorms will be required with the final measures to be determined by the appointed contractor. These will include the following measures or equivalent measures:
  - Allowing the establishment of vegetation on the exposed soil,

- Providing silt fences or straw barriers at the toe of the stockpile to mitigate runoff during rain events,
- Surrounding stockpiles with cut-off ditches to contain runoff,
- Directing any runoff to the site drainage system to a suitable sediment control structure before discharging to a drainage system, and
- Providing bunds or another form of diversion to keep runoff from entering the stockpile area.

4.3.9 Use of Concrete

Concrete will be used to construct kerbs, footpath, manholes, etc. The use of concrete will be minimised as much as possible. However, if the use of concrete is unavoidable, the following measures shall be employed:

- The use and management of concrete in or close to watercourses will be carefully controlled to avoid spillage. Alternate construction methods are encouraged for example, use of pre-cast concrete or permanent formwork will reduce the amount of in-situ concreting required,
- Weather conditions will be considered when planning construction activities which require the use of wet concrete to minimise the risk of the runoff of concrete 'washout' from site,
- Where on-site batching is proposed by the appointed contractor this activity will be carried out at least 10m from surface water drains or watercourses. Washout from such mixing plant will be carried out only in a designated contained impermeable area,
- Batching and mixing activities and material storage areas will be located at least 10m (as per CIRIA guidance listed in Section 5.4.1.2) away from surface water drains or watercourses,
- Chute washout will be carried out at designated locations only, at least 10m from surface water drains or watercourses. These locations will be signposted throughout the construction works areas. Chute washout locations will be provided with appropriate designated, contained impermeable area and treatment facilities including adequately sized settlement tanks,
- The clear water from the settlement tanks shall be pH corrected prior to discharge to any surface water drains or watercourses,
- There will be no hosing of concrete, cement, grout, or similar material spills into surface water drains or watercourses. Such spills shall be contained immediately, and runoff prevented from entering the watercourse, and
- Discharge of washout water to wastewater (foul) sewer will only be carried out with the express permission of the sewerage undertaker and will be treated to the standard required; for example, because of its high pH (alkalinity), washout water may need treatment before disposal to the foul sewer.

4.3.10 Accidental Spills

The site compounds shall be provided with spill/leak containment facility for fuel or chemicals in addition to the storm water and foul flows from the site. Refuelling shall be done on impermeable and bunded areas within the site compound away from any watercourses where oil interceptors are installed.

Refuelling and maintenance in areas where there is a risk of surface water contamination shall be avoided where possible.

4.3.11 Environmental Incident Response Plan

An Incident Response Plan (IRP) will be prepared by the appointed Contractor as part of the CEMP. The IRP ensures that, in the unlikely event of an incident, response efforts are prompt, efficient, and suitable for the circumstances. This plan is a working document and will be maintained by the appointed contractor during the Construction Phase. The plan includes measures to address surface water related incidents such as accidental spillages of noxious substances e.g., oil and significant releases of sediment or concrete washings.

4.3.12 Vehicles and Plant

- Vehicles and plant provided for use on the Proposed Scheme will be in good working order to ensure optimum fuel efficiency, and will be regularly inspected to ensure they are free from leaks and are promptly repaired when not in good working order,
- Spill kits will be carried on all vehicles,
- Vehicles and plant will not park near or over surface water drains or watercourses,
- Refuelling of vehicles and plant will be carried out on hard standing surfaces, using drip trays to ensure no fuel can contaminate the ground outside of the bunded areas,
- For deliveries and dispensing activities, the appointed contractor will ensure that:
  - Site-specific procedures are in place for bulk deliveries,
  - Delivery points and vehicle routes are clearly marked, and
  - Emergency procedures are displayed, and a suitably sized spill kit is available at all delivery points, and staff are trained in these procedures and the use of spill kits.
- The appointed contractor will provide wheel washing facilities, and any other necessary measures to remove mud and organic material from vehicles, at the Construction Compound, where necessary. These will be located at least 10m away from any surface water drains or watercourses,
- The cleaning of delivery trucks shall be carried out at the Construction Compound and shall not be undertaken at the works areas,
- The surface run-off from vehicle washing areas will be directed to an on-site treatment system where possible; this also increases the potential for reusing the water. Such a treatment system would typically include:
  - A settlement tank to remove suspended solids such as mud and silt,
  - Catchpits or silt traps on drains and ensure that they are in place during cleaning. Empty them at regular intervals, and
  - Removal of oil, grease, petrol, and diesel from wash water by passing it slowly through an appropriately sized oil separator.
- The use of detergents in the cleaning process will be minimised; where required, biodegradable and phosphate-free detergents will be used,

- If detergents are used in the washing process, the wash water will not be directed through the oil separator as this will prevent it from working. It will be contained and disposed of off-site using a suitable licensed waste disposal operator, or if a foul or combined sewer is nearby, the surface runoff could be directed to it, with the permission of the sewerage undertaker, and
- To further minimise water used for washing vehicles, trigger-operated spray guns will be used, with an automatic water supply cut-off.

4.4 Construction Compounds

The main construction compounds will be located at Galway Harbour and a satellite construction compound at Galway Cathedral. The compounds will be used for material stockpiling, loading/unloading, fuel and machinery store, canteens, site office, toilet facilities, etc.

Further details on the Construction Compound are provided in Chapter 5 (Construction) of Volume 2 of this EIAR.

4.4.1 Site Compound Establishment

The proposed main site compound at Galway Harbour and the satellite site compound at the Galway Cathedral Car Park will include site offices, welfare facilities for GCC and Contractor's personnel, and limited car parking for site and staff vehicles. The site compounds shall be established in accordance with the mitigation measures outlined in the EIAR. As a minimum:

- Surface water drains will be located and clearly signposted,
- All materials will be stored safely in line with best industry practice. Fuels and chemicals will be stored in bunded areas,
- The site compounds must be fenced off with setback of at least 5m from surface water receptors,
- Gaol Road, south of the satellite site Compound, is in Flood Zone B from fluvial source. This site compound is not impacted by this flood. However, access and egress to the site must not be from the southern side using Gaol Road,
- The main site Compound at Galway Harbour is not in Flood Zone A or B. However, the access route bridge over Lough Atalia will be submerged by excessive flood depth for a 0.5% AEP tidal event. In such scenario, the appointed contractor will be required to include a flood response plan within to ensure that incidents do not result in a pollution risk to the water body.
- Surface runoff from compounds shall be minimised by ensuring that the paved/impervious area is minimised. All surface water runoff from the site compounds shall be intercepted and directed to appropriate treatment systems (settlement facilities and oil trap) for the removal of pollutants prior to discharge.

4.4.2 Security

The Construction Compound will be fenced off, lit (during working hours) and secured with Closed-Circuit Television (CCTV), to ensure safe storage of all material, plant and equipment if required, to prevent acts of vandalism that could result in leaks or spills from materials.

4.4.3 Welfare and Sanitary Facilities

The Construction Compound will be engineered with appropriate services as discussed in Chapter 5 (Construction) of this EIAR. Water and wastewater disposal etc. will be organized by the Appointed Contractor. At work areas along the Proposed Scheme, where permanent provisions (for the duration of the construction programme) are not practicable, appropriate temporary provisions will be made. Temporary welfare facilities will need to be used, for example, portable toilets in the vicinity of works. Welfare facilities will discharge wastewater either to an existing sewer, with the permission of the sewerage undertaker, or will be collected and disposed of in an appropriate manner to a suitably licensed facility offsite to prevent water pollution and in accordance with the relevant statutory requirements.

4.4.4 Fuel Storage

- All hydrocarbons used during the Construction Phase will be appropriately handled, stored, and disposed of in accordance with recognised standards as laid out by the EPA,
- All chemical and fuel filling locations will be contained within signposted, designated bunded areas, a minimum of 10m from any surface water drain or watercourse,
- From compounds, where the site is pervious, an area of hard standing will be installed in a demarcated area for refuelling, and vehicle / plant cleaning and service areas. This area will be drained via a hydrocarbon interceptor trap to a soakaway,
- The retained contents of the separators will be collected for disposal by a licensed operator to a licensed waste disposal / recovery facility,
- Suitable precautions will be taken to prevent spillages from equipment containing small quantities of hazardous substances (for example, chainsaws and jerry cans) including:
    - Each container or piece of equipment will be stored in its own drip tray made of a material suitable for the substance being handled,
    - Spill kits and drip trays will be provided for all equipment and at locations where any liquids are stored and dispensed, and staff will be trained on the procedures to be followed, and
    - Containers and equipment will be stored on a firm, level surface.

- Procedures and contingency plans will be in place at each work areas to address cleaning up small spillages as well as dealing with an emergency incident (see Section 6.3.1). A stock of absorbent materials such as sand, spill granules, absorbent pads and booms will be kept at each work site, on plant working near water and particularly at refuelling areas and where fuel or oil is stored,
- When working in or in proximity to watercourses, an absorbent containment boom will be installed across the watercourse or around the works, securely and closely anchored to the banks or working platform,
- The storage of fuels, other hydrocarbons and other chemicals within the Construction Compound shall be in accordance with relevant legislation and with best practice. In particular:
    - Fuel tanks, drums, and mobile bowsers (and any other equipment that contains oil and other fuels) will be housed within a bund of at least 110% capacity of the fuel tank itself or at least 25% of the total volume of the containers, whichever is greatest. The fuel tank will be double skinned. There will be no passive drainage from the bund; any water collected within it will be pumped out and removed off site for disposal, and
    - Any designated area or areas for oils, fuel, chemicals, hydraulic fluids, etc. storage and refuelling will be set up at least 10m from any surface water drains or watercourses (as per CIRIA guidance) and the storage location within the Construction Compound shall be organised to be as far away from surface water drains or watercourses as is practicable to minimise risks from leaks and spills.
- Storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas,
- Fuel fill pipes will not extend beyond the bund wall and will have a lockable cap secured with a chain,
- Where fuel is delivered through a pipe permanently attached to a tank or bowser:
    - The pipe will be fitted with a manually operated pump or a valve at the delivery end which closes automatically when not in use,
    - The pump or valve will be fitted with a lock,
    - The pipe will be fitted with a lockable valve at the end where it leaves the tank or bowser,
    - The pipework will pass over and not through bund walls,
    - Tanks and bunds will be protected from vehicle impact damage,
    - Tanks will be labelled with contents, capacity information and hazard warnings, and
    - All valves, pumps and trigger guns will be turned off and locked when not in use. All caps on fill pipes will be locked when not in use.

4.4.5 Storage of Materials and Waste

The Construction Compound will be operated using a “Just-in-Time” approach, where practicable, for material deliveries to minimise the amount required to be stored.

Where material is required to be stored:

- Storage areas for solid materials, including waste soils (where applicable), will be designed, and managed to prevent deterioration of the materials and their escape (via surface runoff or wind blow),
- Storage areas will be kept secure to prevent acts of vandalism that could result in leaks or spills, and
- All containers of any size will be correctly labelled indicating their contents and any hazard warning signs.

A register of all hazardous substances, which will either be used on site or expected to be present (in the form of soil and / or groundwater contamination) will be established and maintained. This register will be always available and shall include as a minimum:

- Valid Material Safety Data Sheets (MSDS),
- Health and safety, environmental controls to be implemented when storing, handling, using and in the event of spillage of materials,
- Emergency response procedures / precautions for each material, and,
- The Personal Protective Equipment (PPE) required when using the material.

Waste may be stored at the Construction Compound for a limited amount of time to help to limit the number of vehicle movements to and from site as far as possible to minimise effects on the local roads. Where waste is required to be stored:

- It will be stored in secure designated areas, in enclosures or containers to prevent material being dispersed by the wind,
- Designated areas will be sited at least 10m away from surface water drains or watercourses to limit risk of escape and contamination of watercourses,
- Waste storage containers will be labelled with their waste type and their List of Waste (LoW) code; any labelling will be consistent with Industry Best Practice at the time construction commences and reviewed annually,
- Liquid wastes will be stored in containers within bunded zones with secondary containment of at least 110% capacity of the largest container or at least 25% of the total tank capacity inside the bunded zone (whichever is the greatest), and
- Incompatible or hazardous wastes will be stored and handled in accordance with Hazardous Wastes Regulations.

4.5 Drainage Inspection and Surface Water Monitoring

4.5.1 Drainage Inspections

The effectiveness of the drainage system must be monitored periodically by the ECoW during construction to minimise the risk of discharging silt-laden water into the receiving waters. The monitoring frequency is best aligned with changing weather events and drainage conditions, as the project progresses.

Event based inspections by the ECoW are as follows:

- >10 mm/hr,
- >25 mm in a 24-hour period[1], or,
- Rainfall depth greater than monthly average in 7 days.

4.5.2 Surface Water Quality Monitoring

The Appointed Contractor shall carry out visual monitoring of surface water control measures (settlement tanks, silt fences, fuel storage areas etc.) on a daily basis. In addition, weekly visual inspections of the water bodies in proximity to Proposed Scheme will be carried out by the Appointed Contractor.

Indicators that water pollution may have occurred include the following:

- Change in water colour,
- Change in water transparency,
- Increases in the level of silt in the water,
- Oily sheen to water surface, and
- Floating detritus, or scums and foams.

Suspended solids and turbidity will also be monitored.

If hydrocarbons are observed or other water quality parameters are suspected to have been exceeded, an investigation will be carried out to determine whether any element of the construction of the Proposed Scheme could be causing the contamination. If any potential sources of contamination are observed, appropriate actions will be taken (depending on the source and nature) to prevent further contamination and the incident shall be recorded and investigated in more detail to prevent a recurrence. If required, the relevant regulatory authorities will be informed.

[1] Met Eireann definition: A very wet day means rainfall accumulations ⩾10 mm in 24 hours. While falls of 10 mm or more in 24 hours would have a greater impact on outside activities.

5 Construction and Demolition Resource and Waste Management Plan

5.1 Introduction

This Construction and Demolition Resource and Waste Management Plan (CDRWMP) has been prepared to ensure that waste arising during the Construction Phase and Demolition Phase of the Proposed Scheme, will be managed and disposed of in a way that ensures compliance with the provisions of the Waste Management Act, and associated Regulations to ensure that optimum levels of reduction, re-use and recycling are achieved. The purpose of this CDRWMP is to facilitate reuse and recycling and divert waste from landfill.

The CDRWMP is consistent with best practice management practices and any relevant mitigation measures as contained within the EIAR. The content and headings used in this CDRWMP comply with the EPA Best Practice Guidelines for the Preparation of Resource Management Plans for Construction and Demolition (C&D) Projects (EPA 2021a).

This CDRWMP is based on the estimated quantities of waste generation and the proposed management measures from the Proposed Scheme at planning stage.

5.1.1 Legislation, Policy and Guidance

Resource and waste management takes place in a legislative and policy framework. Applicable legislation, policy and best practice guidance was reviewed during preparation of the CDRWMP. The key components of EU, national and local policy, legislation, and guidance relevant to proposed C&D are summarised as follows:

- Prevention and minimisation of waste is the preferred option;
- Where C&D waste is generated, it should be source separated to facilitate reuse and recycling and to maximise diversion of waste from landfill;
- Where waste may not be prevented or recycled it should be transported and disposed of in accordance with applicable legislation and without causing environmental pollution; and
- Waste may only be transferred by a waste collection permit holder and delivered to an authorised waste facility.

5.1.1.1 Legislative Context

The EPA Best Practice Guidelines for the Preparation of Resource Management Plans for Construction and Demolition (C&D) Projects (EPA 2021a) states that a plan is mandatory for all C&D projects, as best practice to inform the planning consent process. At planning stage, it is estimated that the Proposed Scheme will generate more than 100m^3 in volume of C&D waste, through demolition. Therefore, to comply with these guidelines, a Tier 2, bespoke C&D Plan has been prepared.

5.1.1.2 Guidance

An overview of relevant legislation, policy and best practice guidance related to waste management is presented in Appendix 18.1 Legislation and Policy in Volume 4 of this EIAR, however the main guidance documents used in the preparation of the CDRWMP were:

- Connacht-Ulster Waste Region (CUWR) (2016). Connacht Ulster Region Waste Management Plan;
- EU Construction & Demolition Waste Management Protocol (European Commission 2018)
- C&D Waste Soil and Stone Recovery / Disposal Capacity Update Report 2020 (Regional Waste Management Offices 2020);
- A Waste Action Plan for a Circular Economy, Ireland's National Waste Policy 2020-2025 (Department of Communications, Climate Action and Environment (DCCAE 2020);
- Circular Economy Action Plan, For a Cleaner and More Competitive Europe (European Commission 2020);
- Best Practice Guidelines for the Preparation of Resource Management Plans for Construction and Demolition Projects – Draft for Public Consultation (EPA 2021a);
- Circular Economy Act 2021;
- Whole of Government Circular Economy Strategy 2021-2022, Pre-Consultation Draft (Department of Environment, Climate and Communications (DECC) 2021a); and
- Whole of Government Circular Economy Strategy 2022-2023: Living More, Using Less (DECC 2021b).

5.1.1.3 Sustainable Resource and Waste Management Principles

As stated in Section 17.2 in Chapter 17 (Waste & Resources) in this EIAR, the principal objective of sustainable resource and waste management is to use resources more efficiently, where the value of products, material and resources is maintained in the economy for as long as possible such that the generation of waste is minimised. To achieve resource efficiency there is a need to move from a traditional linear economy to a circular economy.

As stated in the Waste Action Plan for a Circular Economy, Ireland's National Waste Policy 2020-2025 'In a circular economy the value of products and materials is maintained for as long as possible; waste and resource use are minimised, and resources are kept within the economy when a product has reached the end of its life, to be used again and again to create further value' (DCCAE 2020).

The EU Circular Economy Action Plan notes that '*the EU needs to accelerate the transition towards a regenerative growth model that gives back to the planet more than it takes, advance towards keeping its resource consumption within planetary boundaries, and therefore strive to reduce its consumption footprint and double its circular material use rate in the coming decade'* (European Commission 2020).

However, where residual waste generation is unavoidable, it will be dealt with in a way that follows the waste hierarchy, (as shown in Section 17.1.1.2 in Chapter 17 (Waste & Resources) in this EIAR). The waste hierarchy supports the need to achieve efficient use of material resources, minimise the amount of waste produced (or otherwise increase its value as a resource) and reduce, as far as possible, the amount of waste that is disposed to landfill.

The Department for Environment, Climate & Communications released a Whole Government Circular Economy Strategy 2022-2023 (DECC 2021b), setting out a policy framework for transitioning to a circular economy, measures to reduce the circularity gap, raise awareness and support investment into circular initiatives and identify barriers.

5.1.1.4 Waste Management Target

Ireland achieved 82.4% material recovery of C&D waste in 2019, as stated in the EPA National Waste Statistics, Summary Report for 2018 (EPA 2021b). Under Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2009 on waste and repealing certain Directives and Directive 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (hereafter referred to as the Waste Framework Directive), EU Member States must achieve 70% of material recovery of non-hazardous and non-soil-and-stone C&D waste by 2020.

Every effort will be made to achieve the required level of material recovery of C&D waste as part of the Proposed Scheme. A baseline of available waste capacity for 2020 was calculated in Chapter 18 (Waste & Resources) of this EIAR and summarised in Table 13. This data has been used to establish a baseline of available waste capacity for 2020. The available C&D waste capacity in CUWR, and so the construction waste baseline, is approximately 795,800 million tonnes based on the following assumptions:

- using the minimum available capacity for permitted facilities within the CUWR (only including facilities that accept a single waste type in order to avoid double counting capacity and excluding Donegal and Monaghan);
- including only licensed facilities accepting soil and stones; and
- including all Article 27 notifications for 2020 in the CUWR.

Table 13: C&D waste management baseline for CUWR, 2020 (permitted, licensed and Article 27 notifications)

C&D Waste Management Baseline for 2020	Capacity/ annual intake (Tonnes)
Minimum Permitted capacity (Regional Waste Management Office (Offaly County Council, 2021)	685,316
Licenced annual intake (soil and stone facilities) (EPA 2022)	90,000
Article 27 (by-product) notifications (EPA 2021c)	20,500
Total	795,796

5.2 Proposed Scheme Description

Information on the Proposed Scheme will be included in this section of the CDRWMP. This information will assist those without detailed knowledge of the Proposed Scheme in quickly familiarising themselves with the key elements of the Proposed Scheme and will also assist those who have a need to examine, review or audit the CDRWMP.

Details will include a description of the key elements of the Proposed Scheme, an overview of the main works required at each section, the construction programme, construction methodology, plant and equipment requirements, details on the Construction Compounds, construction traffic management measures, and interfaces with other projects.

5.3 Roles and Responsibilities

The roles and responsibilities of key stakeholders are discussed in Section 1.8. The contractor will appoint a suitably qualified person to maintain the CDRWMP, who will be responsible for the following:

- Detailing and maintaining the CDRWMP, and updating it as appropriate;
- Following each update or revision of the CDRWMP, providing the CDRWMP to GCC, appointed contractor and all relevant personnel;
- Ensuring that all personnel are instructed about the objectives of the CDRWMP and informed of the responsibilities which fall upon them as a consequence of its provision. This will be carried out during the induction process for new personnel;
- Communicating the requirements of the CDRWMP using for example, toolbox talks, prominently displayed notices and audits as relevant;
- Implementing the CDRWMP throughout the Demolition, Excavation, and Construction Phases of the Proposed Scheme; and
- Ensuring where training is required regarding the handling and management of wastes on site that this is provided where required.

The appointed contractor and all personnel handling wastes must be in a position to:

- Distinguish reusable materials from material suitable for recycling;
- Ensure maximum segregation of waste and recyclables at source;
- Co-operate with the appointed contractor on best locations for stockpiling reusable material;
- Separate material for recovery; and
- Identify and liaise with operators of recovery outlets as appropriate.

Copies of the CDRWMP will be made available to all relevant personnel.

5.3.1 Auditing

Resource audits will be conducted during the Construction Phase. The quantity and types of waste and materials leaving site during the Construction Phase will be recorded. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity to each facility. Records will show material, which is recovered, which is recycled, and which is disposed of.

These audits will cover work practices, record keeping, and off-site tracking as follows:

- Periodic audits and inspections of work practices to assess compliance with the CDRWMP. The audit protocol will be risk based and focus on key issues of concern;
- A review of all records of wastes and resources generated on-site and transported off-site periodically throughout the Construction Phase. If waste movements are not accounted for, the reasons for this are to be established to understand why the record keeping system has not been maintained and implement corrective actions if needed;
- The resource records will be compared with established targets for the site (e.g., reuse of resource target or recycling of waste target);
- Examining material management on-site to determine where the largest percentage residual waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how project contract targets can be achieved; and
- Issue corrective actions (training, penalties, etc.) as required to site operatives where deviations of the CDRWMP are observed.

5.3.2 Tracking and Tracing

The appointed contractor is required to maintain records for all resource material which is used on site and leaves the Proposed Scheme, either for reuse, recycling, energy recovery, backfilling or other recovery or disposal on third party sites. A recording system must be put in place to record residual waste and resources generated on the Proposed Scheme. The type of information to be recorded in the site tracking system is described below.

- For each movement of resource off-site, a signed docket / invoice will be obtained from the haulier / contractor detailing the following:
  - A description of the resource stream;
  - List of Waste (LoW) Code for each stream (where applicable);
  - Validated quantity of material moved off site by the haulier / contractor (typically reported in tonnes);
- The name and authorisation of the haulier to transport the material; in the case of a ‘waste’ this requires a valid Waste Collection Permit (WCP). In the case of by-product or other materials that are not a waste, no WCP is required. In both cases the vehicle registration number should also be recorded for each load of material removed from site;

- The name and authorisation of the destination site for the resource; again, for a 'waste' this requires a valid Cert of Registration, Waste Permit or Waste Licence and in the case of by-product the relevant by-product determination;
- The waste contractors must be required to provide details of end-use or waste treatment in waste reports;
- This recording will be carried out for each resource type and the system will also be linked with the delivery records. In this way, the percentage of residual resource generated for each material can be determined; and
- The system will allow the comparison of these figures with the targets established for the prevention, reuse and recovery of resources to highlight the successes or failures against these targets.

It is the obligation of the appointed contractor or their appointed person to ensure that all resources taken off site are in line with the relevant legislation and the key area relates to ensuring that hauliers and collection sites have the appropriate authorisations.

5.4 Key Materials, Quantities and Costs

5.4.1 Introduction

C&D waste is defined as waste which arises from construction, renovation and demolition activities. Typical C&D wastes which are likely to arise during the Construction Phase of the Proposed Scheme are set out in Appendix 17.2 List of Waste Codes for Construction and Demolition Wastes in Volume 4 of this EIAR, including EPA LoW codes.

The most environmentally sustainable means of managing excavated material is its prevention and minimisation. See Section 17.2.4.3 in Chapter 17 (Waste & Resources) of this EIAR for the principles of waste management. The appointed contactor will be responsible for implementation of these for the Proposed Scheme. In recent years there has been a shift in focus on best practice waste management and waste minimisation in construction and an increase in the reuse of construction by-products in projects.

It is expected that materials will be generated by the Proposed Scheme during the following activities:

- Demolition;
- Excavation; and
- Construction.

Likely materials that will be generated during each of these activities are discussed in further detail in Section 5.4.2 to Section 5.4.5.

5.4.2 Demolition Waste Generation

As described in Chapter 5 (Construction) of the EIAR, the main structures to be demolished along the Proposed Scheme are:

- No. 20 St. Brendan's Avenue; and
- No. 5/6 Headford Road.

A large portion of demolition waste is expected to be inert waste such as concrete, brick and tiles etc. Metal waste will also be generated from demolition. Segregated wood, glass and plastic will also be generated.

The estimated quantity and type of waste that will be generated by demolition activities in connection with the Proposed Scheme is provided in Table 14. The estimated 700 tonnes of demolition waste which will be generated as a result of the Proposed Scheme is equivalent to 0.09% of the C&D waste management baseline in the CUWR set out in Table 13.

Table 14: Estimated Demolition Waste Types and Quantities

Waste Type	Approximate Waste and Material Quantity (Tonnes)
Concrete, bricks, tiles and similar	590
Metals	90
Segregated wood, glass and plastic	20
Total	**700**

5.4.3 Excavation Waste Generation

Excavation waste will arise from such activities as:

- Excavation of existing carriageways (e.g., road narrowing, removal of islands);
- Excavation of existing footpaths and cycle tracks and pedestrianised areas (e.g., widening, urban realm improvement; and
- Excavation for utility diversions and / or protections.

The waste types likely to be generated during the Construction Phase are set out in Table 15. The total forecast of surplus excavation material from the Proposed Scheme will be 68,100 tonnes and is equivalent to 8.56% of the C&D waste management baseline for the CUWR set out in Table 13.

Table 15: Summary of Excavation Material Type and Quantities

Materials from C&D Sources	Approximate Waste and Material Quantity (Tonnes)
Soil and stone	36,500
Concrete, bricks, tiles and similar	12,300
Bituminous mixtures	19,300
Total	**68,100**

5.4.4 Construction Waste Generation

Construction works, site offices and temporary works facilities are also likely to generate waste. General construction waste can vary significantly from site to site but typically will include the following non-hazardous fractions:

- Soil and stone;
- Concrete, brick, tiles and ceramics;
- Bituminous mixtures;
- Metals;
- Wood;
- Municipal type wastes generated by construction employees; and
- Other.

The hazardous waste streams which could arise from construction activities include the following:

- Waste electrical and electronic equipment (WEEE) components;
- Batteries;
- Asbestos;
- Wood preservatives;
- Liquid fuels; and
- Contaminated soil.

Also included within this definition are surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities.

The Construction Phase will require the importation of a number of key construction materials for the Proposed Scheme works. This material will include items such as concrete, granular fill / aggregate, bituminous mixtures and structural steel. Table 16 provides an estimate of the quantities of the major materials required to complete the Construction Phase of the Proposed Scheme.

Table 16: Estimated Quantities of Major Construction Materials Required by the Proposed Scheme

Materials	Estimated Quantity (Tonnes)
Asphalt	21,300
Granular Material	45,670
Concrete	34,000

In the case of the Proposed Scheme, the most likely type and quantity of general construction waste will be surplus concrete and unusable or damaged pipe segments which may arise on-site. Quantities of these materials are estimated to be small; assumed to be approximately between 5% to 15% of construction material delivered to site, as stated in the WRAP Builders: Estimating Waste (WRAP 2014). There is adequate capacity for the management of such wastes, see Table 13. Segregation facilities will be provided to ensure that recovery and recycling of such wastes are maximised.

5.4.5 Municipal Waste Generation

It is anticipated that there will be approximately 70-80, possibly up to 100 at peak, construction staff employed over the Construction Phase of the Proposed Scheme. Small volumes of general municipal wastes will be generated by construction staff during the Construction Phase (e.g., from offices and welfare facilities). Segregation facilities will be provided on the construction site to ensure that recovery and recycling of such wastes is maximised.

5.4.6 Costs of Waste Management

While landfill disposal has been the most commonly used method for waste management in Ireland in the past, waste to energy incinerators are also now in operation at Poolbeg, Dublin 4 and in Carranstown, County Meath.

Typically, the current cost of disposal of waste to landfill in Ireland exceeds €170 per tonne. From 1 July 2013 in accordance with the Waste Management (Landfill Levy) (Amendment) Regulations 2013 the 'landfill levy' increased to €75 per tonne for waste disposed to landfill. Disposal of hazardous waste can cost from €350.

In addition to landfill operator fees and landfill levies there are additional costs included in the 'true cost of waste management' including:

- The purchase cost of waste materials (including imported soil);
- Handling costs;
- Storage and transportation costs; and
- Revenue generated from sales.

Therefore, in order to reduce costs associated with waste management, surplus materials should be reused and recycled where possible and materials should be carefully stored and handled to minimise risk of damage.

5.5 Waste Management

5.5.1 Introduction

GCC is committed to implementing the principles of sustainable resource and waste management as set out in Section 5.1.1.3. Waste from the Proposed Scheme will be managed in accordance with the principles of circular economy and the waste hierarchy. Waste disposal will be minimised, in so far as is reasonably practicable, and opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Scheme.

Following appointment, the contractor will be responsible for maintaining the CDRWMP. It will be at the discretion of the appointed contractor to determine how material from the Proposed Scheme will be managed. It is assumed, as a worst-case scenario, that all excavated soil will be managed or disposed of at an authorised facility, either in Ireland or abroad. However, all of the below options may also be used.

5.5.2 Demolition Waste Management

All material generated from the Proposed Scheme will be considered for reuse for construction within the Proposed Scheme or in other construction projects in accordance with Article 27 of the Waste Directive Regulations 2020 (S.I. 323 of 2020), (hereafter referred to as the Waste Directive Regulations). It will be the responsibility of the appointed contractor to review feasibility of reuse of materials and ensure that the necessary testing is undertaken to demonstrate compliance with Article 27, as appropriate.

Materials will require on-site segregation by waste classification and if not suitable for reuse, will be delivered to an authorised recycling, recovery or disposal facility.

Where practicable and appropriate, and if in reusable condition, street and roadside infrastructure such as bus stops, lighting poles, traffic signals, manhole access covers, and signs will be reused within the Proposed Scheme. If not reused, they will be delivered to appropriately authorised recycling or recovery facilities.

Where metal railings and gates are removed, they may have inherent value due to their metal content. These will be delivered for metal recycling to an authorised waste facility where not reused.

Some example facilities which are currently authorised to accept metal and electronic waste include:

- Irish Lamp Recycling Co. Ltd, Woodstock Industrial Estate, Kilkenny Road, Athy, Co. Kildare; and
- Hammond Lane Metal Company, Pigeon House Road, Dublin 4, Dublin.

The least preferable option is disposal to an authorised facility and will be considered by the appointed contractor when reasonable opportunities for reuse, recycling and recovery are unavailable.

5.5.3 Excavation Waste Management

In line with current practice in Ireland, surplus materials and wastes from the Proposed Scheme will be managed as follows:

- Where practicable, naturally occurring excavated material will be reused within construction in the Proposed Scheme in accordance with Article 2 of the Waste Directive Regulations, the Waste Framework Directive and Section 3 of the Waste Management Act, as amended;
- Excavation material will be used as engineering and landscaping material within the Proposed Scheme and on other projects requiring the types of materials generated, where practicable, through Article 27. Reuse of topsoil and excavated material within the Proposed Scheme is proposed, where practicable. The material will also be subject to testing to ensure it is suitable for its proposed end use;

- Should material meet the acceptance criteria set out in Article 28 of the Waste Directive Regulations, this material will be delivered to recovery or disposal facilities which are authorised to collect this material under the Waste Management Act (i.e., which hold a Certificate of Registration (CoR), Waste Facility Permit (WFP) or EPA Licence), should such recovery or disposal facilities become available by the time of commencement of construction of the Proposed Scheme;
- In accordance with the law all excavation wastes requiring removal from site for recycling or recovery will be delivered to facilities which are authorised under the Waste Management Act (i.e., which hold a CoR, WFP or EPA Licence). Examples of recycling / recovery activities for excavation material include:
  - Processing of stone to produce construction aggregate;
  - Backfilling of quarries; and
  - Raising land for site improvement or development.
- Any hazardous waste arising will be managed by the appointed contractor in accordance with the applicable legislation; and
- In accordance with the law all wastes removed from site will be transported by the holder of the appropriate waste collection permit, granted in accordance with – the Waste Management (Collection Permit) Regulations 2007 – S.I. No. 820 of 2007.

It will be the responsibility of the appointed contractor to secure agreements for acceptance of surplus excavation materials from the Proposed Scheme in authorised and regulated facilities, in accordance with the Waste Management Act and associated regulations.

Where carriageway is removed it will be reused where possible within the Proposed Scheme through implementation of the measures set out below.

Due to the nature of the works in an urban environment there are limited opportunities to achieve a cut / fill balance of materials that could be more readily accommodated on a greenfield project where earthworks embankments / bunds are more common. Material from the existing pavement layers will be temporarily stockpiled at the Construction Compounds and sent to a suitable recovery facility for recycling and reuse as recycled aggregate material in the industry as further described in Section 17.5 in Chapter 17 (Waste & Resources) of this EIAR (Volume 2).

Material for excavation will need to be tested by the appointed contractor for quality, contamination and could potentially be reused as general fill or general landscape fill material in construction under the provisions of Article 27. Material which meets the necessary acceptance criteria will be delivered to an authorised soil recovery facility. Material which requires recycling will be sent to an authorised waste facility and may be used in accordance with Article 28 of the Waste Directive Regulations as amended. Article 28 sets the criteria which must be complied with, and the EPA must use to determine a waste reaches “end of waste” status and becomes a material.

Excavated materials such as capping, subbase, bituminous and concrete materials could be reused or recycled in line with TII specifications:

- Capping, subbase, bituminous and concrete materials could be reused or recycled in fill and capping materials (e.g., 6A, 6B, 6C, 6F, 6G, 6H ,6I, 6M, 6N) providing they comply with the Specification for Road Works Series 600 – Earthworks (CC-SPW-00600) (TII 2013a);
- Subbase, bituminous and concrete materials could be reused or recycled in subbase or base materials (e.g., Granular Material Type A to Clause 803) providing they comply with the Specification for Road Works Series 800 – Unbound and Cement Bound Mixtures (CC-SPW-00800) (TII 2013b); and
- Subbase and bituminous materials could be recycled in base or binder materials (e.g., Asphalt Concrete base and binder products to Clause 3 or Low Energy Bound Mixtures to Clause 8.1) providing they comply with Road Pavements – Bituminous Materials (CC-SPW-00900) (TII 2015c).

Information on quantities of potential material reuse or recycle is provided in Table 17. These pavement materials will either be removed directly from the Proposed Scheme or temporarily stored and removed at a later date as part of a spoil / waste management strategy having consideration of the intermittent nature of the street works construction activities.

5.5.4 Construction Waste Management

The following measures will be implemented during construction, where practicable, to ensure the maximum quantity of material is reused on the Proposed Scheme and to contribute to achieving the objectives set out in the National Waste Action Plan (DCCAE 2020) as follows:

- Stockpiling of existing sub-base, capping layer and topsoil material generated on-site for direct reuse in the Proposed Scheme where practicable in the Construction Compounds (subject to material quality testing to ensure it is suitable for its proposed end use); and
- Recycled aggregates and reclaimed bituminous mixtures will be specified in the Proposed Scheme where practicable. For example, suitable recycled aggregates and appropriate site won material may be specified in the proposed road base / binder layers, sub-base layers under footpaths / cycle tracks, and capping layer material within the road, footpath and cycle track pavement, subject to testing to ensure material is suitable for its proposed use.

Information on the quantities of potential material reuse is provided in Table 17. It is estimated that potentially up to approximately 19,800 tonnes of recycled or reused materials could be incorporated into the Proposed Scheme. The waste management measures which will be implemented by the appointed contractor in so far as reasonably practicable are also set out in Table 17.

Table 17: Quantities of Proposed Material for Reuse and Recycling

Reuse or Recycle	Material for Reuse or Recycle	Approximate Quantity (Tonnes)	Reuse or Recycle Specification for Example TII Series or Other Reuse or Recycle Specification	Reuse or Recycle Class (note: Class to be Provided in all Cases where TII Specification is used)
Recycle on Proposed Scheme	Bituminous Materials	2,300	TII Series 800 and 900 (TII 2013b and TII 2015c)	Bituminous plannings for recycle in subbase material, base and binder layers
Reuse on Proposed Scheme	Subbase material	2,600	TII Series 800 (TII 2013b)	Sub-base material
Reuse on Proposed Scheme	Capping material	12,500	TII Series 600 (TII 2013a)	Capping material
Reuse on Proposed Scheme	Concrete	2,400	TII Series 800 (TII 2013b)	CBGM Base to paved footway

5.5.5 Article 27

Surplus excavation material may be declared a by-product (under Article 27 of the Waste Directive Regulations) for reuse in one or more known construction projects.

By-product notifications to the EPA provide an opportunity for reuse of surplus clean soil and stone material arising from construction activity. This can apply to locations other than authorised recovery facilities e.g., quarries operating under planning permission, parks or other developments requiring earthworks and importation of clean soil and stone.

This option can bring significant economic benefits while facilitating beneficial re-use of by-products. This plays a role in Ireland's implementation of Circular Economy principles.

An Article 27 notification to the EPA under Article 27 of the Waste Directive Regulations, is required to achieve by-product status for soil and stones. It is noted that the use of Article 27 is limited to clean soil and stone, and it must be demonstrated to the EPA that the following four conditions are met:

- Further use of the soil and stone is certain;
- The soil and stone can be used directly without any further processing other than normal industrial practice;
- The soil and stone is produced as an integral part of a production process; and
- Further use is lawful in that the soil and stone fulfil all relevant requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

Where it is proposed to use an Article 27 EPA notification in relation to excavation material from the Proposed Scheme, the appointed contractor is responsible for submission of the Article 27 notification to the EPA.

Where it is proposed to use soil from off-site with an Article 27 notification, the appointed contractor is responsible for carrying out any necessary due diligence regarding the material and ensuring that all EPA guidelines relating to that Article 27 notification have been complied with before the soil is imported into the site. Where feasible, appropriate and available Article 27 materials arising from other sites will be used in the development of this site.

The appointed contractor is responsible for ensuring all applicable regulatory requirements under waste, planning and other laws are complied with prior to movement of excavation material. Any hazardous waste arising will be managed in accordance with the applicable legislation.

5.5.6 Soil Recovery at Sites Holding CoR, WFP or EPA Waste Licence

Where removal of wastes from the Proposed Scheme is unavoidable it will be delivered by the appointed contractor only to facilities which are authorised under the Waste Management Act, 1996 as amended and which hold the appropriate CoR, WFP or EPA Waste Licence.

The Waste Management (Facility Permit and Registration) Regulations 2007, as amended sets out the classes of waste activity requiring CoR or WFP. The most relevant class of activity in relation to soil recovery facilities is:

Class 5 (Third Schedule, Part 1 of the Regulations) for the 'Recovery of excavation or dredge spoil, comprising natural materials of clay, silt, sand, gravel or stone and which comes within the meaning of inert waste, through deposition for the purposes of the improvement or development of land, where the total quantity of waste recovered at the facility is less than 100,000 tonnes.'

For CoR and WFP the capacity is typically a lifetime capacity, and when reached, the facility typically closes. CoR and WFP are granted to private operators by local authorities.

EPA licensed waste activities authorised to accept soil and stones for recovery and disposal include soil recovery sites, landfills, transfer stations and materials recovery facilities. These typically handle a larger tonnage of wastes than facilities holding CoR or WFP. EPA Waste Licences typically include an annual maximum intake capacity and a maximum lifetime capacity for the licensed facility.

Where the appointed contractor proposes to deliver excavated materials from the Proposed Scheme to facilities holding a CoR, WFP or EPA Waste Licence the appointed contractor is responsible for ensuring the authorisation is valid and allows acceptance of the relevant List of Waste Code.

A copy of the authorisation will be included in the Plan and evidence will be provided that the proposed facility will have capacity to accept the required quantity of waste from the Proposed Scheme.

5.6 Proposed Scheme Infrastructure

5.6.1 Construction Compounds

Construction Compound requirements to facilitate the Construction Phase of the Proposed Scheme are illustrated in Section 5.6 in Chapter 5 (Construction) of this EIAR. The main Construction Compounds will be located in the Galway Harbour Enterprise Park, within Galway Docks and a satellite compound at Galway Cathedral Car-Park.

The Construction Compounds will contain a site office, and welfare facilities for GCC personnel and contractor personnel. Limited car parking will be allowed at the Construction Compounds. Materials such as topsoil, subsoil, concrete, rock etc., will be stored at the Construction Compounds for reuse as necessary. Items of plant and equipment will also be stored within the Construction Compounds. All necessary authorisations, under the Waste Management Act, as amended, will be obtained prior to undertaking temporary storage.

5.6.2 Waste Collection and Transportation

Waste from the Proposed Scheme will be transported by authorised waste collectors in accordance with the Waste Management (Collection Permit) Regulations, 2007 as amended.

A list of currently authorised waste collectors used to transport waste during the Proposed Scheme will be maintained at the Construction Compounds and updated by the appointed contractor. Copies of valid appropriate waste collection permits will also be held at the Construction Compounds by the appointed contractor. A list of the currently authorised waste collectors is available on the following website: https://www.nwcpo.ie/permitsearch.aspx.

5.6.2.1 Hazardous Wastes

The following steps must be taken where hazardous waste is being transported from the Proposed Scheme to a hazardous waste recovery or disposal facility within Ireland:

- Waste transfer forms shall be obtained by the waste producer from the local authority website, and completed on-line before the waste is collected;
- A copy shall be downloaded, printed and signed, accompanying the consignment of hazardous waste when it is in transit; and
- On the load's arrival, the operator of the recipient disposal or recovery facility shall log-in and complete the relevant details documenting the receipt of the waste.

Export of hazardous waste from the Proposed Scheme outside of Ireland is subject to a Europe-wide control system founded on Regulation (EC) 1013 of 2006 on the European Parliament and of the Council of 14 June 2006 on shipments of waste (known as the Transfrontier Shipment Regulations), as amended. This legislation is supplemented by the Waste Management (Shipments of Waste) Regulations 2007 – S.I. 419 of 2007, as amended, which makes DCC responsible for the enforcement of this regulatory system throughout Ireland.

Export of hazardous waste from the Proposed Scheme outside Ireland should comply with the procedures set out in this legislation.

5.6.3 Waste Recovery and Disposal

Wastes will be delivered to authorised waste facilities in accordance with the Waste Management Act as amended. The following authorisations are applicable:

- CoR from the local authority (issued to private sector);
- CoR from the EPA (issued to local authority);
- WFP from the local authority; and
- Waste Licence from the EPA.

A list of currently authorised (CoR or WFP) waste sites in each local authority is available on the following website: http://facilityregister.nwcpo.ie/. A list of sites currently licensed by the EPA (Waste Licence) is available on the following website: http://www.epa.ie/terminalfour/waste/.

An up-to-date list of all waste facilities to which waste from the site will be delivered will be maintained on site and updated by the appointed contractor. Copies of valid facility CoR, WFP, and EPA Waste Licences will be held on site by the appointed contractor.

6 Environmental Incident Response Plan

6.1 Introduction

This Environmental Incident Response Plan (EIRP) has been prepared to ensure that in the unlikely event of an incident, response efforts are prompt, efficient, and suitable for the particular circumstances. The EIRP details the procedures to be undertaken in the event of a significant release of sediment into a watercourse, or a significant spillage of chemical, fuel or other hazardous substances (e.g., concrete), non-compliance incident with any permit or license, or other such risks that could lead to a pollution incident, including flood risks. The EIRP will identify the onsite risks and appropriate responses. The focus of including the measures in this EIRP is on prevention of the incident arising in the first place.

6.1.1 Objectives

The objectives of this EIRP are to:

- Ensure the health and safety of personnel and visitors along the Proposed Scheme;
- Minimise any impacts to the environment and ensure protection of the water quality and the aquatic species dependent on it;
- Minimise any impacts on properties, services etc.; and
- Establish procedures that could enable personnel to respond to incidents with an integrated multi-departmental effort and in a manner that minimises the possibility of loss and reduces the potential for affecting health, property, and the environment.

6.1.2 Guidance

This EIRP has been prepared with regard to the following guidance documents, where relevant:

- Control of Water Pollution from Linear Construction Projects. Technical Guidance (C648) (CIRIA 2006a);
- Control of Water Pollution from Linear Construction Projects. Site Guide (C649) (CIRIA 2006b); and
- Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532) (CIRIA 2001);
- A Framework for Emergency Management (Department of Housing, Local Government and Heritage (DHLGH) 2021); and

6.2 Roles and Responsibility

The EIRP will be reviewed and updated regularly so that it continues to apply to construction activities and is amended when applicable regulations are revised or when amendments are required by a regulatory authority.

It will be the responsibility of the EM or equivalent as stipulated by the appointed contractor to maintain and change the EIRP as required. The EIRP may also require amendments from the various stakeholders or suppliers as the Proposed Scheme progresses.

The appointed contractor shall provide a full list, including the exact locations, of all pollution control plant and equipment. All such plant and equipment shall be maintained in place and in working order for the duration of the works.

As part of the development and management of the EIRP, the appointed contractor will:

- Assess the pollution risks and develop emergency and spill response procedures for specific construction activities;
- Obtain details of key people that may need to be contacted for help in the event of an incident;
- Provide equipment for dealing with pollution incidents;

- Identify emergency access routes along the Proposed Scheme;
- Train personnel to follow procedures and use equipment correctly;
- Audit the EIRP; and
- Take action following an incident to ensure it does not occur again.

6.2.1 Contacts

The EIRP will detail the initial contact that should be made in case of an emergency incident as well as those responsible for following up once an emergency event is declared. To cover the full length of the Proposed Scheme, more than one contact may be needed. The EIRP will indicate which contacts apply to which sections of the Proposed Scheme.

Contact details will include the organisation, position title, name, mobile phone number and email address of relevant personnel. Numbers will be obtained for contacts, including the following:

- Radio / mobile contacts for management staff and trained personnel;
- Out-of-hours contacts;
- Environmental regulators (hotline or local contact);
- Local authorities;
- Fire Services;
- Irish Water (IW);
- National Parks and Wildlife Service (NPWS);
- Environmental Protection Agency (EPA);
- Department of the Environment, Climate and Communications (DECC);
- Department of Housing, Local Government and Heritage (DHLGH); and
- Spill response and clean-up contractors.

6.2.1.1 Training and Testing

Personnel will be trained on the implementation of the EIRP and how to use the necessary equipment such as spill kits. Emergency arrangements will need to be reviewed and tested periodically (and always after an incident) to ensure that measures are effective, and that the workforce is aware of what to do in the event of an incident. Emergency drills will be recorded, and improvements noted and actioned accordingly.

6.3 Environmental Emergency Response Procedures

6.3.1 Fuel and Chemical Spillages

For pollution prevention measures refer to the SWMP in Section 4. Emergency procedures will be further developed; either Proposed Scheme specific, works area specific or activity specific and all personnel will be required to know these procedures.

An effective pollution EIRP relies on the following elements, with regards to fuel, and chemical spillages:

- Identification of receptors / pathways (e.g., surface water drains and / or watercourses);
- Identification and clear marking of surface water drain locations within the Construction Compounds;
- Identification of all possible emergency scenarios;
- Effective planning, e.g., availability of booms, spills kits at appropriate locations along the Proposed Scheme;
- Identification and dissemination of contact numbers;
- Definition of personnel responsibilities;
- Assurance that all appropriate personnel are aware of the emergency procedure(s) (e.g., spillage, leakage, fire, explosion, and flooding), that drain covers and spill kits are available, and personnel know how to use them;
- Knowledge of incident scenarios, such as spill drills; and
- Implementation of lessons learnt from previous incidents.

In terms of pollution spill response procedures, these will vary depending on the sensitive receptor and nature of construction activities, however the following information will be included as a minimum and displayed at appropriate locations along the Proposed Scheme, at river crossings, near outfalls, refueling locations, fuel storage areas etc.:

- Instructions on how to stop work and switch off sources of ignition;
- Instructions on how to contain the spill;
- Location of spill clean-up material;
- Name and contact details of responsible personnel (these personnel should assess the scale of the incident to determine whether the environmental regulator needs to be called); and
- Measures particular to that location or activity (for example, close to a settlement pond).

More detailed plans may be location-specific, or specific to a particular activity depending on the nature of the work. They will identify the potential sources of pollution and pathways to receptors so that containment measures can be put in place at these locations. Suitable equipment, such as spill kits, oil booms and absorbent material, will be held at appropriate locations along the Proposed Scheme and personnel will be trained in the use of the equipment.

Emergency equipment will be obtained from a reputable supplier, and personnel will be trained in its correct use. Material Safety Data Sheets (MSDS) and best practice assessments will be used for advice on appropriate spill measures. The type of equipment required will depend on the activity taking place. The Construction Industry Research and Information Association, Control of Water Pollution from Linear Construction Projects(C648), Technical Guidance document (CIRIA 2006a), hereafter referred to as the CIRIA Technical Guidance Document, provides details on the types and applications of emergency equipment. Refer to Table 15.2 of the CIRIA Technical Guidance Document for further information.

Every effort will be made to prevent an environmental incident during the Construction Phase of the Proposed Scheme. The objective of the measures in the EIRP and the SWMP is to prevent an incident arising in the first place. Oil / fuel spillages are one of the main environmental risks that will exist during the Construction Phase of the Proposed Scheme which will require an emergency response procedure. An example of the steps that could be followed in the event of a spillage to ensure that the environmental risk is reduced to as low as reasonably practical is provided in this section. This procedure can be tailored to be location / activity specific as required:

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers;
- Notify the EM immediately giving information on the location, type, and extent of the spill so that they can take appropriate action;
- If necessary, the EM will inform the appropriate regulatory authority, including the Fire Services, depending on the size and nature of the spill. The appropriate regulatory authority will vary depending on the nature of the incident;
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident;
- Contain the spill using the spill control materials, track mats or other material as required. Do not use detergent or hoses to disperse spilled fuel;
- If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses or sensitive habitats;
- Clean up as much as possible using the spill control materials;
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited;
- The details of the incident will be recorded on an Environmental Incident Form (such as that provided in Section 6.3.3 or equivalent identified by the appointed contractor), which will provide information such as the cause, extent, actions, and remedial measures used following the incident. The form will also include any recommendations made to avoid reoccurrence of the incident. This form will be appended to the EIRP;
- A record of all environmental incidents will be kept on file by the EM and the appointed contractor. These records will be made available to the relevant authorities if required; and
- The EM will be responsible for any corrective actions required as a result of the incident e.g., an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the appointed contractor as appropriate.

By carrying out the above steps, a proper system will be in place to investigate, record and report any potential fuel or chemical spillages.

6.3.2 Other Environmental Incidents

Environmental incidents are not limited to just fuel spillages. For example, other environmental incidents could include:

- Accidental stripping of a protected habitat;
- Accidental excavation of protected archaeological structure (without archaeologist present);
- Accidental release from settlement pond / tank etc.; and
- Unplanned utility strikes, resulting in foul water releases, temporary loss of services etc.

Therefore, any environmental incident will be investigated in accordance with the following steps.

- Immediately notify the EM, giving information on the location, type, and extent of the incident so that they can take appropriate action;
- In the very unlikely event of an incident occurring which may impact on a sensitive receptor, the EM will inform the appropriate persons / regulatory authority. The appropriate persons / regulatory authority will vary depending on the nature of the incident;
- The details of the incident will be recorded on an Environmental Incident Form (such as that provided in Section 6.3.3 or equivalent identified by the appointed contractor) which will provide information such as the cause, extent, actions, and remedial measures used following the incident.
- The form will also include any recommendations made to avoid reoccurrence of the incident. This form will be appended to the EIRP;
- A record of all environmental incidents will be kept on file by the EM and the appointed contractor. These records will be made available to the relevant authorities if required; and

- The EM will be responsible for any corrective actions required as a result of the incident e.g., an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the appointed contractor as appropriate.

By carrying out the above steps, a proper system will be in place to investigate, record and report any potential accidents or incidents.

6.3.3 Environmental Incident Form

An example of an Environmental Incident Form (EIF) is provided in Table 18. An EIF will record details of any environmental incidents. This form will be appended to the EIRP.

Table 18: Environmental Incident Form Example

Incident Details	
Date:	
Time:	
Location:	

Incident Details				
Extent:				
Direct Activity being Undertaken:				
Cause:				
Dangerous Substances(s) Involved (identity and quantity):				
Remedial Measures Undertaken:				
Parties Involved in the Incident				
Name	**Role**	**Phone Number**	**Email**	**Address**
Description of the Incident				
Recommendations following the Incident				

6.3.4 Fire Control

Every effort will be made to prevent the outbreak of a fire during the Construction Phase of the Proposed Scheme. Fire extinguishers and first aid supplies will be available in the work area. In the event of such an incident, the health and safety of all personnel will be a priority. All relevant legislation and guidance on health and safety of people and in particular fire safety will be complied with.

6.3.5 Flood Risk Control

Where temporary stockpiles of invasive species infected material cannot for practical limitations, be situated away from a potential flood risk area, the appointed contractor will be required to include a flood response plan within the EIRP, to ensure that any inundation of the Construction Compounds does not result in a pollution event to nearby water bodies.

6.4 Corrective Action

When an incident happens, it is important to learn from it and ensure that such an incident does not occur again. This may involve changing the method of work for a particular activity, providing containment or treatment materials, or simply training personnel so they are aware of the correct method of work. Similarly, if an audit of planned arrangements indicates that measures are not in place, or those in place need to be improved, action will be taken immediately.

A record of corrective actions and lessons learned will be kept and communicated to all relevant persons, teams, sub-contractors etc. across the Proposed Scheme.

7 References

Animal and Plant Health Agency, Natural England, Bristol Zoological Society (2018). Good Practice Management, New Zealand pygmyweed (Crassula helmsii) Version 1, August 2018

Construction Industry Research and Information Association (2001). Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532).

Construction Industry Research and Information Association (2005). PUB C650 Environmental Good Practice on Site, 2nd Edition.

Construction Industry Research and Information Association (2006a). Control of Water Pollution from Linear Construction Projects. Technical Guide (C648).

Construction Industry Research and Information Association (2006b). Control of Water Pollution from Linear Construction Projects. Site Guide (C649).

Construction Industry Research and Information Association (2015). Environmental Good Practice on Site Guide, 4th Edition.

Department of Agriculture and Rural Development (Northern Ireland) (2016). Countryside Management Publications, Giant hogweed.

Department of Communications, Climate Action and Environment (2020). A Waste Action Plan for a Circular Economy Ireland's National Waste Policy 2020-2025.

Department of Culture, Heritage and the Gaeltacht (2017). National Biodiversity Action Plan 2017-2021.

Department of Environment, Climate and Communications (2021a). Whole of Government Circular Economy Strategy 2021-2022, Pre-Consultation Draft.

Department of Environment, Climate and Communications (2021b). Whole of Government Circular Economy Strategy 2022-2023, Living More, Using Less.

Department of Housing, Local Government and Heritage (2021). A Framework for Major Emergency Management.

Department of Transport, Tourism and Sport (2019a). Chapter 8, Temporary Traffic Measures and Signs for Roadworks, Traffic Signs Manual.

Enterprise Ireland (2003). Best Practice Guidelines BPGCS005 – Oil Storage Guidelines.

Environment Agency (2010). Managing Invasive Non-Native Plants in or near Fresh Water.

Environment Agency (2013). Managing Japanese knotweed on Development Sites: The Knotweed Code of Practice. (Version 3, amended in 2013, withdrawn from online publication in 2016).

Environment Agency (2014). Aquatic and Riparian Plant Management: Controls for Vegetation in Watercourses, Technical Guide.

Environmental Protection Agency (2021a). Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects – Draft for Public Consultation.

Environmental Protection Agency (2021b). Construction & Demolition Waste Statistics for Ireland.

European Commission (2018). EU Construction and Demolition Waste Protocol and Guidelines.

European Commission (2020). Circular Economy Action Plan, For a Cleaner and More Competitive Europe.

Inland Fisheries Ireland (2010). Biosecurity Protocol for Field Survey Work.

Inland Fisheries Ireland (2016). Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.

Invasive Species Ireland (2008a). Best Practice Management Guidelines for Japanese knotweed.

Invasive Species Ireland (2008b). Best Practice Management Guidelines for Himalayan balsam.

Invasive Species Ireland (2008c). Best Practice Management Guidelines for Giant hogweed.

National Roads Authority (2006a). Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes.

Non-Native Species Secretariat (2018). Allium triquetrum (Three-cornered garlic) Great Britain Non-Native Organism Risk Assessment.

Northern Ireland Environment Agency (2021). Management Measures for Widely Spread Species (WSS) in Northern Ireland Nuttall's waterweed (Elodea nutallii).

Regional Waste Management Offices (2020). Construction & Demolition Waste Soil and Stone Recovery / Disposal Capacity, Update Report 2020.

Regional Waste Management Office (2021). Waste Permit Facility Register.

Transport Infrastructure Ireland (2007). Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan.

Transport Infrastructure Ireland (2013a). Specification for Road Works Series 600 – Earthworks (including Erratum No. 1, dated June 2013). Standard CC-SPW-00600.

Transport Infrastructure Ireland (2013b). Specification for Road Works Series 800 – Road Pavements – Unbound and Cement Bound Mixtures. Standard CC-SPW-00800.

Transport Infrastructure Ireland (2015a). Design Manual for Roads and Bridges Part 3 DN-DNG-03022 (NRA HD 33/15) (Including Amendment No. 1).

Transport Infrastructure Ireland (2015b). Road Drainage and the Water Environment DN-DNG-03065).

Transport Infrastructure Ireland (2017). The Management of Waste from National Road Construction Projects.

Transport Infrastructure Ireland (2020a). The Management of Invasive Alien Plant Species on National Roads – Technical Guidance.

Transport Infrastructure Ireland (2020b). The Management of Invasive Alien Plant Species on National Roads – Standard.

WRAP (2014). Builders: Estimating Waste.

Directives and Legislation

Air Pollution Act 1987 (S.I. 6 of 1987).

Circular Economy Act 2021.

Directive 2008/98/EC of the European Parliament and of the Council.

Directive 2018/851 of the European Parliament and of the Council.

European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011).

European Communities (Waste Directive) Regulations 2020 (S.I. 323 of 2020).

European Council (Shipment of Waste) Regulations 2006 (1013 of 2006).

European Union (Invasive Alien Species) Regulation 2014 (1143 of 2014).

Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013).

Waste Management Act 1996, as amended (S.I. 10 of 1996).

Waste Management (Collection Permit) Regulations 2007 (S.I. 820 of 2007).

NTA

Údarás Náisiúnta Iompair
National Transport Authority

National Transport Authority
Dún Scéine
Harcourt Lane
Dublin 2
D02 WT20

Comhairle Cathrach na Gaillimhe
Galway City Council

Project Ireland 2040
Building Ireland's Future